

CURRENT AGRICULTURAL RESEARCH IN AFRICA ON ANNUAL FIELD CROPS AND GRASSLANDS (concluded)

In each of the numbers of this volume of *Field Crop Abstracts*, brief details (obtained from replies to questionnaires) are published of those agricultural research institutes and experiment stations in Africa which are concerned with annual field crops, grasslands and fodder crops. Countries are arranged in alphabetical order. For each station, under the heading *Principal lines of research*, the numbers (1), (2), (3), (4) and (5) refer to : (1) Annual field- or fodder-crops (including cassava), (2) Grass or grass/legume mixtures, (3) Natural grasslands, (4) Farming systems, and (5) Other lines of research concerned with grasslands, fodders or annual field crops (except tobacco). The maximum and minimum shade temperatures relate to 1958 only.

SUDAN

El Obeid, Range Management Section

Location : El Obeid, Kordofan Province. Lat. 13° 09' N. Long. 30° 14' E. Alt. 570 m (1870 ft).

Met. data : Rainfall 383 mm (15 in.) (duration of dry season 39 weeks). Max. shade temp. 43.2°C (109.7°F). Min. shade temp. 8.6°C (47.5°F).

Size of station : 10 hectares (25 acres).

Number of graduate research workers on staff : 2.

Principal lines of research :

- (1) *Vigna* spp.
- (2) Reseeding trials. Establishment of a fodder-plant collection as a basis for selection.
- (3) Effect of fire on natural vegetation.
- (4) Silage-making.

Nisheisheiba, Livestock Improvement Centre

Location : Boundary of Wad Medani town. Lat. 14° 23' N. Long. 33° 29' E. Alt. 1346 ft.

Met. data : Rainfall 16 in. (duration of dry season 24 weeks). Max. shade temp. 108.3°F. Min. shade temp. 55.9°F.

Size of station : 1080 acres.

Number of graduate research workers on staff : 1.

Principal lines of research :

- (1) Trials on various fodder crops for dairy cattle : lubia (*Dolichos lablab*), berseem (*Medicago sativa*), *Clitoria*, Sudan grass.
- (2) Trials on grass/legume mixtures (*Dolichos lablab* and Sudan grass).
- (4) Rotational system providing green fodder all the year round.

Southern Darfur, Livestock and Range Experimental Station

Location : 93 miles S. of Nyala, Southern Darfur District. Lat. 11° 37' N. Long. 26° 0' E. Alt. 2100 ft.

Met. data : Rainfall 27.5 in. (duration of dry season 32 weeks). Max. shade temp. 151.4°F. Min. shade temp. 57.0°F.

Size of station : 1772 acres.

Number of graduate research workers on staff : 4.

Principal lines of research :

- (1) *Sorghum* and *Vigna* spp.
- (2) Indigenous grasses and legumes.
- (3) Reseeding trials, carrying capacity, intensity and frequency of grazing (clipping method), shrub control, range rehabilitation enclosures.
- (4) The cattle depend entirely on natural vegetation for feed. The farm is adopting rotational grazing.

Um Binein, Livestock Improvement Centre

Location : 5 miles S. of Singa town on the W. bank of the Blue Nile. Lat. 13° 04' N. Long. 33° 54' E. Alt. 1430 ft.

Size of station : c. 1100 acres.

Number of graduate research workers on staff : 1.

Principal lines of research :

- (1) *Sorghum vulgare*, *Zea mays*, *Dolichos lablab*, *Medicago sativa* (Arizona type).
- (2) Sudan grass, Para grass.
- (3) An area (c. 3633 acres) is reserved for natural grazing. The following grasses are indigenous : *Brachiaria* sp. aff. *xantholeuca*, *Dactyloctenium aegyptium*, *Sporobolus marginatus*, *Cymbopogon nervatus*, *Brachiaria obtusiflora*, *Tetrapogon spathaceus*, *Aristida* sp.
- (4) Intensive system ; the land is mostly under the crops listed in (1) above.
- (5) *Medicago sativa* (Arizona, Washington and California types), Para grass, American varieties of sorghums and other grasses are grown.

SWAZILAND

Big Bend, Experiment Station

Location : 8 miles S. of Big Bend, on S. bank of the Usutu river. Lat. 26° 52' S. Long. 31° 55' E. Alt. 500 ft.

Met. data : Rainfall 21.2 in. (duration of dry season 22 weeks). Max. shade temp. 84.2°F. Min. shade temp. 60.0°F.

Size of station : 1500 acres.

Number of graduate research workers on staff : 1. This is a sub-station of Malkerns Res. Sta.

Principal lines of research :

- (1) Rice, cotton : varietal and agronomic trials.
- Rice : irrigation studies.
- (3) Management studies.
- (5) Sugar-cane research is the main function of this sub-station.

Goedgegun, Experiment Station

Location : Goedgegun. Lat. 27° 07' S. Long. 31° 12' E. Alt. 3300 ft.

Met. data : Rainfall 33.7 in. Max. shade temp. 74.2°F. Min. shade temp. 53.6°F.

Size of station : 300 acres.

Number of graduate research workers on staff : 1. This is a sub-station of Malkerns Res. Sta.

Principal lines of research :

- (1) Maize, cowpeas, soyabeans, beans : varietal, agronomic and nutritional studies.
- (2) Varietal and nutritional studies on non-irrigated pastures.
- (3) Burning experiments.
- (5) Investigations on control of *Striga*.

Malkerns, Research Station

Location : Malkerns, 20 miles W. of Bremersdorp. Lat. 26° 33' S. Long. 31° 10' E. Alt. 2500 ft.

Met. data : Rainfall 35 in. (duration of dry season 17 weeks). Max. shade temp. 101.3°F. Min. shade temp. 53.6°F.

Size of station : 600 acres.

Number of graduate research workers on staff : 5.

Principal lines of research :

(1) Maize, sorghum, rice, beans, cotton : varietal, agronomic and nutritional studies. Rice : irrigation studies.

(2) Varietal and nutritional studies on irrigated, intensively used pastures.

(3) Burning and management studies.

(4) Peasant unit-holding studies.

(5) Nutritional studies. Citrus research is the main function of this station.

TANGANYIKA**Arusha, Northern Regional Research Centre**

Location : Northern Province. Lat. 3° 30' S. Long. 36° 30' E. Alt. 4100 ft.

Met. data : Rainfall 38.14 in. (duration of dry seasons 22 weeks and 4 weeks). Max. shade temp. 80-85°F. Min. shade temp. 60-65°F.

Size of station : 500 acres.

Number of graduate research workers on staff : 7.

Principal lines of research :

(1) Wheat and maize : breeding and agronomic studies. Seed beans (*Phaseolus* spp.) grown for export : pest and disease control.

(2) Studies of imported and local species, particularly methods of establishment and management, and comparative production.

(3) Management of natural grassland.

Bagamoyo, Coast Agricultural Station

Location : Eastern Province. Lat. 6° 30' S. Long. 39° E. Alt. 50 ft.

Met. data : Rainfall 41.50 in. (duration of dry season 22 weeks). Max. shade temp. 85°F. Min. shade temp. 70°F.

Size of station : 350 acres.

Number of graduate research workers on staff : Nil.

Principal lines of research :

(1) Rice, cassava : agronomic trials.

(4) Studies of methods for improving poor sandy coastal soils. Effect of interplanting coconuts with annual crops.

(5) This station is mainly concerned with coconuts and cashew nuts.

Bukoba, Maruku Sub-station

Location : West Lake Province. Lat. 1° 30' S. Long. 32° E. Alt. 4000 ft.

Met. data : Rainfall 97.75 in. (duration of dry season 6 weeks). Max. shade temp. 75-80°F. Min. shade temp. 60-65°F.

Size of station : 500 acres.

Number of graduate research workers on staff : 1.

Principal lines of research :

(2) Studies with local and imported grass and legume species.

(3) Management and improvement of local "rweya"-type grassland.

(4) Studies of cropping systems for "rweya" land (an infertile soil type frequently occurring in the locality).

(5) This station is largely concerned with coffee research.

Fela, Western Regional Research Centre

Location : Lake Province. Lat. 2° 30' S. Long. 33° E. Alt. 3933 ft.

Met. data : Rainfall 30.56 in. (duration of dry season 22 weeks). Max. shade temp. 80-85°F. Min. shade temp. 60-65°F.

Size of station : 600 acres.

Number of graduate research workers on staff : 6.

Principal lines of research :

(1) Cotton : breeding, agronomy, pathology and entomology. General agronomic studies with other crops.

(2) Studies with local and introduced species.

(3) Studies of methods of grassland management.

(4) Studies of means for maintaining and improving soil fertility by rotation, fallowing, integration of cattle and crop husbandry.

Kilosa, Central Regional Research Centre

Location : Eastern Province. Lat. 7° S. Long. 37° E. Alt. 1650 ft.

Met. data : Rainfall 40.02 in. (duration of dry season 22 weeks). Max. shade temp. 80-85°F. Min. shade temp. 60-65°F.

Size of station : 1600 acres.

Number of graduate research workers on staff : 5.

Principal lines of research :

(1) Maize, soyabeans, groundnuts : agronomic studies, particularly intercropping systems and effect of sowing date. Cotton : breeding, agronomy and entomology.

(2) Agronomic trials with local and introduced grasses and legumes.

(3) Management studies. Control of regenerating woody species.

Mbozi, Sub-station

Location : Southern Highlands Province. Lat. 9° S. Long. 33° E. Alt. 5000 ft.

Met. data : Rainfall 45.25 in. (duration of dry season 26 weeks). Max. shade temp. 70-75°F. Min. shade temp. 55-60°F.

Size of station : 300 acres.

Number of graduate research workers on staff : 1.

Principal lines of research :

(1) Soyabeans and various legumes for seed : agronomic trials.

(5) This station is mainly concerned with coffee research.

Nachingwea, Southern Regional Research Centre

Location : Southern Province. Lat. 10° 30' S. Long. 39° E. Alt. 1200 ft.

Met. data : Rainfall 36.82 in. (duration of dry season 26 weeks). Max. shade temp. 85°F. Min. shade temp. 65-70°F.

Size of station : 800 acres.

Number of graduate research workers on staff : 6.

Principal lines of research :

(1) Maize, rice, soyabeans, groundnuts, sesame : agronomic studies. Soyabeans, sesame : plant-breeding.

(4) Studies of methods for maintaining and improving soil fertility by rotations, bush fallowing and use of cattle manure.

Nzega, Mwanhala Sub-station

Location : Western Province. Lat. 4° S. Long. 33° E. Alt. 4100 ft.

Met. data : Rainfall 31-58 in. (duration of dry season 26 weeks). Max. shade temp. 85°F. Min. shade temp. 60-65°F.

Size of station : 400 acres.

Number of graduate research workers on staff : 1.

Principal lines of research :

(1) Maize, sorghum, groundnuts, sesame : agronomic studies, intercropping systems.

(4) Studies of means for maintaining and improving soil fertility by rotation, integration of cattle and crop husbandry.

UGANDA**Kawanda, Research Station**

Location : 8 miles N. of Kampala, Kingdom of Buganda. Lat. 0° 25' N. Long. 32° 32' E. Alt. 3924 ft.

Met. data : Rainfall 45.3 in. (duration of dry seasons, 6 weeks and 4 weeks). Max. shade temp. 92.8°F. (abs. max.) 84.0°F (mean max.). Min. shade temp. 54.0°F (abs. min.) 59.6°F (mean min.).

Size of station : 820 acres.

Number of graduate research workers on staff : 20.

Principal lines of research :

(1) Maize : breeding for rust resistance, short term and high yields. Beans : varietal trials and observation plots, pest and disease control. Cotton : fertilizer and seed-dressing experiments.

(2) Grazing and cutting trials on elephant grass, Rhodes grass, Guinea grass and lucerne. Observation plots of tropical legumes and grasses. Soil improvement studies with grasses, legumes and mixtures.

(3) Management trials on reclaimed swamps. Ecological studies of savannas.

(4) An appraisal of all farming systems in the Protectorate. Model costings farm of 40 acres.

(5) Pests of crop storage.

Makerere College, University Farm

Location : 11 miles N. of Kampala. Lat. 0° 30' N. Long. 32° 40' E. Alt. 3900 ft.

Met. data : Rainfall 45 in. Max. shade temp. 93°F. Min. shade temp. 58°F.

Size of station : 340 acres.

Number of graduate research workers on staff : 4 (University lecturers doing part-time research).

Principal lines of research :

(1) Sweet-potatoes : varietal, agronomic, spacing and fertilizer studies.

(2) Evaluation of grass species for use in leys. The management of elephant grass (*Pennisetum purpureum*).

Namulonge, Cotton Research Station (Empire Cotton Growing Corporation)

Location : About 17 miles N. of Kampala. Lat. 0° 32' N. Long. 32° 37' E. Alt. 3766 ft.

Met. data : Rainfall 42 in. (duration of dry seasons, 6 weeks and 4 weeks). Max. shade temp. 94.5°F. Min. shade temp. 52.4°F.

Size of station : 2400 acres.

Number of graduate research workers on staff : 17.

Principal lines of research :

(1) Cotton is the principal crop but is considered as part of a rotation based on the successive crop sequences : maize/cotton ; groundnuts/beans ; maize/cotton. This 3-year arable cycle is followed by 3 years' grass ley.

(3) Investigations of the suitability of *Chloris gayana* and *Pennisetum purpureum* for leys using Nganda cattle.

(4) Studies on farming systems and forward budgets for single-tractor cotton farms in areas where profitable perennial crops cannot be grown.

Serere, Experiment Station

Location : 18 miles S.W. of Soroti, Teso District. Lat. 1° 31' N. Long. 33° 27' E. Alt. 3600 ft.

Met. data : Rainfall 53.3 in. (duration of dry seasons 9 weeks and 3 weeks). Max. shade temp. 98.9°F. Min. shade temp. 60.0°F.

Size of station : 1700 acres.

Number of graduate research workers on staff : 9.

Principal lines of research :

(1) Sorghum, bulrush millet, finger millet (*Eleusine*), cowpeas, groundnuts, beans, lucerne, sesame : varietal, spacing, fertilizer and general agronomic trials. Cotton : fertilizer and varietal trials.

(2) Grazing, cutting and palatability trials of elephant grass, Rhodes grass, Guinea grass and *Hypparrhenia* with and/or without *Stylosanthes*, *Centrosema*, *Glycine* and *Desmodium*.

(3) Bush-clearing experiments and management of natural grassland.

(5) Stock management trials.

UNITED ARAB REPUBLIC

EGYPT

Alexandria (Faculty of Agriculture, University of Alexandria)

Location : Alexandria. Lat. 31° 24' N. Long. 29° 43' E. Alt. 0 m.

Met. data : Rainfall 5-8 in. (duration of dry season 27 weeks). Max. shade temp. 92°F. Min. shade temp. 43°F.

Size of station : 550 acres.

Number of graduate research workers on staff : 20.

Principal lines of research :

(1) Wheat, barley, maize, cotton : cultural methods. Cotton : physiological studies.

(2) *Trifolium alexandrinum*, lucerne, Sudan grass, sorghum, *Trifolium alexandrinum* + Italian ryegrass or Wimmera ryegrass, cowpeas + Sudan grass or sorghum.

Assiut (College of Agriculture, University of Assiut)

Location : Assiut. Lat. 27° 11' N. Long. 31° 6' E. Alt. 57 m (187 ft).

Met. data : Max. shade temp. 44°C (111.2°F). Min. shade temp. 4°C (39.2°F).

Size of station : 200 acres.

Number of graduate research workers on staff : 25.

Principal lines of research :

(1) Wheat, barley, maize, *Vicia faba*, *Cicer*, lupins, lentils, *Trifolium alexandrinum*, sugar-beet, cotton, flax.

(2) Sudan grass, sweet Sudan grass + *Dolichos lablab*, maize + *Dolichos lablab*, sweet Sudan grass + cowpeas, maize + cowpeas.

(5) Breeding, physiology, soil fertility, diseases and pests.

Bahitim, Experimental Station

Location : Bahitim, near Cairo.

Met. data : Duration of dry season c. 26 weeks, end-June-mid-Dec. Max. shade temp. 106.7°F. Min. shade temp. 36.7°F.

Size of station : 500 acres.

Number of graduate research workers on staff : 19.

Principal lines of research :

(1) Wheat, barley, maize, *Vicia faba*, *Trifolium alexandrinum*, cotton : breeding, agronomy, plant pathological problems.

(2) *Trifolium alexandrinum* with barley.

Elserw, Experimental Station

Location : Elserw. Lat. 31° 14' N. Long. 31° 39' E. Alt. 2 m (7 ft).

Met. data : Rainfall 2.63 in. Max. shade temp. 90.7°F. Min. shade temp. 45.0°F.

Size of station : 1500 acres.

Number of graduate research workers on staff : 1.

Principal lines of research :

(1) Wheat, barley, sorghum, rice, *Trifolium alexandrinum*, cotton.

Gemmeiza, Experimental Farm

Location : Gemmeiza. Lat. 30° 48' N. Long. 31° 7' E. Alt. 9 m (30 ft).

Met. data : Rainfall 1.5 in. Max. shade temp. 94.5°F. Min. shade temp. 41.7°F.

Size of station : 1300 acres.

Number of graduate research workers on staff : 4.

Principal lines of research :

(1) Wheat, barley, maize, sorghum, rice, *Vicia faba*, *Trifolium alexandrinum*, cotton, flax.

Giza, Experimental Station

Location : Giza. Lat. 30° 03' N. Long. 31° 13' E. Alt. 21 m (69 ft).

Met. data : Rainfall 1 in. Max. shade temp. 106.7°F. Min. shade temp. 36.7°F.

Size of station : 80 acres.

Number of graduate research workers on staff : 5.

Principal lines of research :

(1) Cereals, forage sorghums, legumes, *Vigna sinensis*, *Lathyrus sativus*, *Vicia*, *Medicago*, *Trifolium alexandrinum*, sugar-beet, fibre crops, cotton, oil crops.

(2) *Medicago sativa*, *Panicum antidotale*, *P. maximum*, *Pennisetum ciliare*, *Dactylis glomerata*, *Chloris gayana*, *Bromus*.

Mahallet Mousa, Experiment Station

Location : Mahallet Mousa. Lat. 31° 7' N. Long. 30° 57' E.

Alt. 6 m (20 ft).

Met. data : Max. shade temp. 93.6°F. Min. shade temp. 42.8°F.

Size of station : 8090 acres.

Number of graduate research workers on staff : 6.

Principal lines of research :

(1) Wheat, barley, maize, sorghum, rice, *Vicia faba*, *Trifolium alexandrinum*, cotton, flax.

Mallawi, Experimental Station

Location : Mallawi. Lat. 27° N. Long. 31° E. Alt. 50 m (164 ft).

Met. data : Rainfall 0.08 in. Max. shade temp. 97.9°F.

Min. shade temp. 44.2°F.

Size of station : 372 acres.

Number of graduate research workers on staff : 1.

Principal lines of research :

(1) Wheat, maize, sorghum, legumes, *Vicia faba*, *Trifolium alexandrinum*, cotton.

Mataana, Experiment Station

Location : Mataana. Lat. 25° 18' N. Long. 32° 34' E.

Alt. 82 m (269 ft).

Met. data : Max. shade temp. 101.8°F.

Size of station : 818 acres.

Number of graduate research workers on staff : 3.

Principal lines of research :

(1) Wheat, barley, maize, sorghum, beans, *Trifolium alexandrinum*, cotton, sesame.

Orman, Field Crops Research Station

Location : Orman, Giza. Lat. 30° 2' N. Long. 31° 13' E.

Alt. 21 m (69 ft).

Met. data : Rainfall 20 mm (0.8 in.). Max. shade temp. 106.7°F. Min. shade temp. 36.7°F.

Size of station : 60 acres.

Principal lines of research :

(1) Wheat, oats, barley, maize, sorghum, millets, rice, cowpeas, groundnuts, *Vicia faba*, lentils, *Trifolium alexandrinum*, *Dolichos lablab*, *Lathyrus*, lucerne, cotton, flax, sesame, safflower, sunflower, Sudan grass.

(2) *Panicum antidotale*, *P. maximum*, *Pennisetum ciliare*, *Chloris gayana*, *Festuca arundinacea*, *Phalaris tuberosa*, *Dactylis glomerata*.

(4) Three years' rotation.

(5) Cultural practices concerning fertilizing, seed rates, spacing, sowing date, time and number of cuts in relation to forage and seed yields, etc.

Sakha, Experimental Station

Location : Sakha. Lat. 31° 7' N. Long. 30° 57' E. Alt. 6 m (20 ft).

Met. data : Max. shade temp. 93.6°F. Min. shade temp. 42.8°F.

Size of station : 9340 acres.

Number of graduate research workers on staff : 15.

Principal lines of research :

(1) Wheat, barley, maize, sorghum, rice, *Vicia faba*, *Trifolium alexandrinum*, cotton, flax.

Shandaweel, Experiment Station

Location : Shandaweel. Lat. 31° 40' N. Long. 26° 30' E.

Alt. 59 m (197 ft).

Met. data : Max shade temp. 98.6°F. Min. shade temp. 41.0°F.

Size of station : 702 acres.

Number of graduate research workers on staff : 1.

Principal lines of research :

(1) Wheat, sorghum, millet, lupins, lentils, fenugreek (*Trigonella foenum-graecum*), *Trifolium alexandrinum*, cotton, sesame.

Sids, Experimental Farm

Location : Sids. Lat. 29° 4' N. Long. 31° 6' E. Alt. 28 m (92 ft).

Met. data : Max. shade temp. 96.1°F. Min. shade temp. 41.5°F.

Size of station : 950 acres.

Number of graduate research workers on staff : 11.

Principal lines of research :

(1) Wheat, barley, maize, sorghum, rice, *Vicia faba*, *Trifolium alexandrinum*, cotton.

ZANZIBAR

Kizimbani, Experimental Station

Location : Kizimbani. Lat. 6° S. Long. 39° 15' E. Alt. 250 ft.

Met. data : Rainfall 70.8 in. (duration of dry season extremely variable, 2 - 10 weeks). Max. shade temp. 94.0°F. Min. shade temp. 62.5°F.

Size of station : 500 acres.

Number of graduate research workers on staff : 1.

Principal lines of research :

(1) Rice, maize, sweet-potatoes, cassava, yams : varietal, cultural and manurial trials.

(2) Various grasses and legumes have been imported for trials under different local conditions. The work has been very limited.

(3) Various tests of herbicides in planted pastures.

ADDENDUM

KENYA

Njoro, Plant Breeding Station

Location : 12 miles from Nakuru. Lat. 0° 18' S. Long. 35° 57' E. Alt. 7100 ft.

Met. data : Rainfall 37 in. (duration of dry season 12 weeks).

Size of station : 400 acres.

Number of graduate research workers on staff : 4. This is the headquarters of the Plant Breeding Service of the Department of Agriculture ; with sub-stations, mainly for maize, at Kakamega, Katumani and Kitale — see pp. 5 and 6.

Principal lines of research :

(1) Wheats : breeding for resistance to stem-, leaf- and yellow-rusts, rust-pathology problems, particularly identification and study of stem-rust races ; multiplication and certification of new varieties. Oats, barley, maize : breeding on a small scale.

FIELD CROPS

CEREALS

WHEAT

See also Abs. 1611, 1619, 1958.

1566 STINSON, T. B. **Tribune Branch Experiment Station report on wheat, barley, and oats.** *Bull. 433 Kans. agric. Exp. Sta.* 1961, pp. 19, 4 maps.

The results of a 17-yr study of rotations, in a district with an annual rainfall of 15–19 in., showed that winter wheat after summer fallow yielded 26.6 bu/ac, whereas a second crop of winter wheat after fallow yielded 12.2 bu/ac. The yield of wheat after fallow begun in April was slightly more than when fallow was begun in autumn. Additional advantages lay in the retention of snow [and hence moisture] by the stubble, reduction of cultivation costs and control of wind erosion.—R.H.F.

1567 KUKLIN, A. K. [Dates for sowing spring wheat in the forest-steppe of the Novosibirsk Province.] [Russian] *Selekt. Semenovod. (Select. Seed Prod.)* 1961, 26, No. 2, 17–20. [Blagovesčensk Agric. Inst.]

1568 WATSON, D. J. and FRENCH, S. A. W. **Competition within a wheat crop.** *Rep. Rothamsted Exp. Sta.* 1960 Harpenden, 1961, 94–5.

A comparison was made of the growth of winter wheat in rows 7 in. apart (normal spacing), 21 in. apart (wide spacing) and in edge rows (normal spacing on 1 side and wide on the other). The yield of grain in the wide rows was 200%, and in the edge rows 60% of that of the normally spaced rows. These differences could be wholly accounted for by the differences in leaf area in the period from ear emergence to harvest. It was concluded that, during vegetative growth, competition between the rows was mainly for nutrients and also for light and that after ear emergence there was no competition for light.—R.H.F.

1569 DÉZSI, L. and others. **Összefüggés az őszi búza növény­sűrűsége, tápanyagfelvétele és termése között.** [Correlations between plant density, mineral uptake and yield in winter wheat.] *Növénytermelés* 1960, 9, No. 4, 299–308, bibl. 15, English summary.

The results of similar experiments conducted in 4 districts under widely different meteorological

conditions and on different soil types showed that the yield of winter wheat is dependent primarily on plant density. A significantly greater number of productive tillers was produced on thinly sown plots, nevertheless the final density of stand was always greater where the initial plant density was high. The number of seeds per spike was found to be inversely proportional to plant density. Mineral nutrient supplies in the booting stage were better on normally and thickly sown plots, while at heading thinly sown plants were better supplied with nutrients, as shown by the mineral nutrient content of root exudates. Analysis of root exudates showed that maximum yield was related to maximum amounts of mineral nutrients in the exudates; a thinly sown crop, however, made the most efficient use of available nutrients. F. Eng. s.—G.M.R.

1570 CHAMBERS, S. C. **Bare patch and poor emergence of cereals. Factors under investigation. 1. Seed treatment and moisture content.** *J. Dep. Agric. W. Aust.* 1961, 2, No. 3, 245–7, bibl. 4.

Grain samples of 2 varieties of wheat, Gabo with a natural moisture content of 9.1% and Insignia 49 with a moisture content of 10.7%, were dusted with various dosages of ceresan, and emergence counts were made. The moisture content of half of each sample was increased to 16%. The results show that overdosages of ceresan did not significantly affect the emergence of either variety, and that increasing the moisture content did not sensitize the grain to ceresan injury.—J.D. [CSIRO]

1571 BRENGLE, K. G. **Soil moisture and yield of winter wheat in eastern Colorado.** *Tech. Bull. 69 Colorado Agric. Exp. Sta.* 1960, pp. 9, bibl. 8.

Data are presented for (1) the yield of wheat [varieties not stated] and (2) soil moisture at 15 atmospheres suction (considered to be the limit of that available for plant growth) to a depth of 5 ft as measured in (a) Sept., (b) early spring and (c) late spring, from 13 sites in eastern Colorado during the years 1953–6. The correlation between yield and soil moisture was highly significant for (b) and (c) but not for (a). The influence on yield of the vertical distribution of the soil moisture is discussed, together with results from other experiments carried out in 1957 and 1958 in which sub-soil irrigation was applied at various depths. It

was concluded that an even distribution supplying particularly the 3–5 ft region was necessary for fullest utilization of available soil moisture.—R.H.F.

1572 RAMIG, R. E. **Relationships of soil moisture at seeding time and nitrogen fertilization to winter wheat production.** *Diss. Abstr.* 1960, **21**, No. 6, 1320–1. [Univ. Nebraska, Lincoln]

1573 BOLDYREV, N. K. [The diagnosis, by chemical analysis of the leaves, of a plant's nutrient requirements and its bearing on the N nutrition of spring wheat by foliar spraying.] [Russian] *Izv. Sibirsk. Otdel. Akad. Nauk SSSR (Bull. Siberian Div., Acad. Sci. USSR)* 1961, No. 4, 79–85, bibl. 19. [Omsk Agric. Inst.]

The author's earlier work with wheat (*Trudy Omsk S-H. Inst.* 1959, Vol. 37, pp. 9–29) showed that with a content of 2.6% N, or less, in the leaves at the end of flowering, and a ratio in the leaves between N and P_2O_5 of 4, or less, foliar applications of N, together with N supplies to the roots, increased the protein content of the grain from 12 to 18–20%. The present work confirms that the effect of foliar applications of N on grain quality falls progressively with an increase in the N content of the leaves from 2.6 to 3%, and with an increase in the ratio between N and P_2O_5 from 4 to 6. Foliar applications of N cannot replace the basic fertilizer required on soils before sowing the crop. There is information on the effect of foliar applications of urea on yields and quality of spring-wheat grain (*Lutescens*-62) grown at different levels of basic N fertilizer.—M.H.

1574 NAKONESHNY, W. and FRIESEN, G. **The influence of a commercial fertilizer treatment on weed competition in spring sown wheat.** *Canad. J. Pl. Sci.* 1961, **41**, No. 2, 231–8, bibl. 14. [Univ. Manitoba, Winnipeg]

Applications of ammonium phosphate fertilizer (11–48–0 [NPK]) at 40 lb/ac on 6 farm fields in Manitoba were effective in reducing losses in wheat yields caused by weed competition. Average losses in yield due to weed competition were 20.5% in unfertilized portions of the fields and only 11.7% in fertilized portions of the same fields. Increases in wheat yields resulting from fertilizer treatment were approximately equal to increases resulting from removal of all weeds from the crop. However, higher yields resulting from fertilizer treatment were sometimes accompanied by decreases in the protein content of the harvested crop. Increased yields resulting from weed removal were generally accompanied by significant increases in the protein content. The combined effects of fertilizer treatment and of weed removal produced the largest increases in yield of wheat and

maintained the protein content at a comparatively high level. F. s.—R.B.

1575 WÅLSTEDT, I. **Svalöfs Drottvärvete i olika odlingsomraden. Svalöfs Drott spring wheat in different growing regions.** *Sverig. Utsädesfören. Tidskr.* 1960, **70**, No. 4–5, 271–93, bibl. 6, English summary.

Drott spring wheat is worth growing in certain regions of Sweden, notably in eastern Central Sweden. Its performance in different parts of the country, in comparison with that of standard varieties, is described. F. Eng. s.—G.M.R.

1576 LUK'JANENKO, P. P. [Winter wheat var. **Bezostaja 1.**] [Russian] *Selekt. Semenovod. (Select. Seed Prod.)* 1961, **26**, No. 3, 50–4, illus. [Krasnodar Sci. Res. Inst. Agric.]

This variety was produced at the Krasnodar Research Institute and is resistant to lodging. It is recommended for northern Caucasia, among other regions. It ripens early (1–3 days earlier than Novoukrainka 84) and the vernalization phase lasts 30–35 days.—M.H.

1577 HEYNE, E. G. **Registration of improved wheat varieties, 24.** *Agron. J.* 1960, **52**, No. 11, 655–8, bibl. 10. [Kansas State Univ.]

The following varieties are described: Conley, Avon, Cornell 595, Genesee, Henry, Lucas, Nured, Yorkwin, Coastal, Coker 47–27, Selkirk, Colorow, Saline. [See also *Fld Crop Abstr.* 12 : 7.]—R.H.F.

1578 OKLAHOMA STATE UNIVERSITY. **New wheat variety being released jointly by Oklahoma and Kansas.** *Publ. Agric. Inf. Serv. Okla State Univ.* Aug. 1960, pp. 2, mimeo.

The variety Kaw, a hard red winter wheat, is described. Its advantages include early maturity, high test weight (61.5 lb/bu) and excellent milling and baking qualities. In Oklahoma it has out-yielded Wichita by 12% at 37 bu/ac [number of seasons not stated] and is adapted to areas where that variety is grown.—R.H.F.

1579† ROSEN, H. R. and others. **Ace, a new soft winter wheat.** *Ark. Fm Res.* 1960, **9**, No. 4, 2, illus.

Ace is resistant to powdery mildew (*Erysiphe graminis tritici*) and to the races of leaf rust (*Puccinia recondita tritici*) currently present in Arkansas.—D.B.

1580 SEED WORLD. **Lathrop spring wheat.** *Seed World* 1961, **88**, No. 6, 21.

The new variety Lathrop has been released from Wisconsin Agricultural Experiment Station. It has high resistance to Hessian fly [*Mayetiola*

destructor], is red-grained and is primarily suitable for feeding to livestock.—R.H.F.

1581 PFEIFER, R. P. **Redcoat winter wheat for Pennsylvania.** *Progr. Rep. 227 Pennsylvania agric. Exp. Sta.* 1960, pp. 2, illus.

The new variety Redcoat is described. It possesses the best combination of yield (5-yr average 42.5 bu/ac), winterhardiness, straw strength and resistance to major diseases and to Hessian fly [*Mayetiola destructor*] which has so far been bred into a variety adapted to Pennsylvanian conditions. In milling and baking qualities it is not below those of standard varieties.—R.H.F.

1582 CIALZETA, C. "Magnif Guaraní M.A.G.". Nueva variedad comercial de trigo. [**Magnif Guaraní M.A.G., a new commercial wheat variety (in Argentina).**] *Idia* 1960, No. 151, 33-6, bibl. 2, illus. [Esta. Exp. Pergamino, Argentina]

1583 BROWN, W. C. and FITZSIMMONS, R. W. **Wheat varieties for 1961.** *Agric. Gaz. N.S.W.* 1961, 72, Pt 2, 57-72, illus.

1584 JONARD, P. Étude des caractéristiques physiques du grain de blé tendre. [**Study of the physical characteristics of the grain of soft wheat.**] *Ann. Amélior. Pl., Paris* 1960, 10, No. 3, 237-73, bibl. 28, illus., English, German and Russian summaries. [Sta. Amélior. Pl., Versailles, France]

This study was concerned mainly with the size and sp. gr. of the grain of the wheat varieties Étoile de Choisy and Cappelle from different regions of France. Only normal floury grains were examined. The final length of the grain was reached early, 20-25 days after flowering, while the final width and final thickness were reached only a short time before maturity. Of the 3 dimensions, width was the one most influenced by climate. Specific gravity of floury grains was constant being about 1.32 at maturity, irrespective of year and variety. Grain, which had been moistened and then dried, had lower sp. gr. values, 1.25-1.20; this indicates that the effect of moistening grain is irreversible.—E.B.O.

1585 GOEBELEZ, A. E. Un procédé peu utilisé pour trier les semences suivant les différences de densité. [**A rarely used practice for separating seeds according to differences in specific gravity.**] *Proc. internat. Seed Test. Ass.* 1961, 26, No. 1, 115-21, English summary. [Fac. Agric., Ankara, Turkey]

See *Fld Crop Abstr.* 11 : 28.

1586 WELLBANK, P. J. and WITTS, K. **Competition between crop and weeds.** *Rep. Rothamsted exp. Sta. 1960 Harpenden*, 1961, 104-5.

In 2 fields of spring wheat, 90 small plots were protected during the application of a hormone-type herbicide. The yield of wheat and density of certain weeds were determined for the sprayed and non-sprayed areas. Within the range 10-30,000 seedlings/sq. yd a 10-fold increase in the density of the weed decreased the yield of wheat by 10% for orache (*Atriplex patula*) and 6% for knot-grass (*Polygonum aviculare*). The presence of 100 plants/sq. yd [as compared with none] decreased the yield of wheat by 20% for *A. patula* and 12% for *P. aviculare*. Yield was not affected by fat hen (*Chenopodium album*) in densities of up to 3000 plants/ac, few of which, however, survived to maturity.—R.H.F.

1587 BALDANZI, G. Aplicação de ervicidas na cultura do trigo. [**Application of herbicides in wheat cultivation.**] *Rev. Agric., Piracicaba* 1961, 36, No. 1, 7-11, bibl. 4, English summary. [Esta. Exp. Curitiba, Paraná, Brazil]

A trial was carried out in 1959 to study the chemical control of weeds, mainly wild turnip (*Brassica rapa* or *B. campestris*), in the wheat variety Frontana. The best control was obtained by treatment with bi-hedonal and weedone LV 4, each applied at 2 l in 400 l of water/ha. These preparations increased wheat yields by 34 and 23%, respectively, over the yield of the untreated controls.—E.B.O.

1588 JONES, R. J. **The control of stem rust in wheat (*Puccinia graminis* var. *tritici*) by aerial application of fungicides.** *E. Afr. agric. for. J.* 1961, 26, No. 4, 210-18, bibl. 19.

Black stem rust (*P. graminis* var. *tritici*) is a serious limiting factor to wheat production in Kenya. At Naro Moru in 1958, 3 varieties were sprayed from 2 to 6 times during growth, with zineb in 5 gal of 4% aqueous solution/ac in an attempt to control this disease. Negligible rain fell on spraying days and the growing-season total of 15.53 in. was normal. The yields in lb/ac for the treatments and control, respectively, were: variety H.462, 1305 and 990; variety 339, 835 and 689; variety 294.B, 407 and 132. Sprayed plots always out-yielded the control and 2 late applications were as good as, or even better than, 3 or 4 early applications. In 1959 a similar trial was carried out using 2 gal of a 5% aqueous solution of the fungicide 0-3818-B (containing 15% Zn and 7% Ni)/ac on the stem-rust-susceptible wheat variety Florence Aurore. Applications were made 3 times after heading. Rainfall (7.66 in.) during the growing season was sub-normal. The average yields in lb grain/ac from plots of 0.374 ac were: sprayed, 1113; control, 1038; this was statistically a highly significant result. The 1000-grain weight and bushel weight were also increased. The Ni content of the grain was increased from 1.78 ppm.

in control to 4.07 ppm. in sprayed plots. The possible influence of Ni on the control of rusts is discussed. In neither experiment was an economic increase in yield obtained.—R.H.F.

1589 PEDERSEN, P. N. and JØRGENSEN, J. Knækkefodsygens og goldfodsygens afhængighed af sædskifte og andre dyrkningsfaktorer. **The effect of crop rotation and cultural treatment on the occurrence of eyespot and take all.** *Tidsskr. Planteavl* 1960, **64**, No. 3, 369–416, bibl. 17, English summary. [Denmark]

The occurrence of eyespot (*Cercospora herpotrichoides*) and take-all (*Ophiobolus graminis*) in wheat and barley fields on the islands of Zealand and Falster was surveyed during 1955–7. The incidence of eyespot was increased by early sowing, heavy N dressings, and early N dressings, and somewhat restricted by heavy dressings of P and K. The incidence of both diseases in wheat was considerably lower in a barley/grass/grass/oats/wheat rotation than in a barley/grass/oats/wheat rotation. F. s.—R.B.

1590 BALDANZI, G. O problema da desinfestação das sementes na cultura do trigo. [The problem of wheat-seed disinfection.] *Rev. Agric., Piracicaba* 1961, **36**, No. 1, 19–23, bibl. 2, English summary. [Esta. Exp. Curitiba, Paraná, Brazil]

In a trial in 1958–9, wheat seed dusted with neantina at 200 g/100 kg of seed yielded almost 10% more, on average, than untreated seed.—E.B.O.

1591 FALANGHE, O. and NETTO, N. D. Contrôle de lagartas dos trigais. [Control of caterpillars on wheat crops.] *Rev. Agric., Piracicaba* 1961, **36**, No. 1, 15–17. [Inst. Biol., Campinas, Brazil]

In the south of São Paulo the most noxious pests of wheat crops are the larvae of *Laphygma frugiperda*, *Agrotis ypsilon* and *Elasmopalpus lignosellus*. In a plot trial with the wheat variety Frontana, 2.5% aldrin, 20% toxaphene, and a mixture of 20% toxaphene plus 0.75% parathion, each applied as dusts at 16 kg/ha, gave good control of these pests. The yield of the treated plots was more than double that of the untreated controls. The crops should be treated at the beginning of an infestation.—E.B.O.

1592 DEPEW, L. J. Control of *Oligonychus pratensis* attacking winter wheat in western Kansas. *J. econ. Ent.* 1960, **53**, No. 6, 1061–3, bibl. 8. [Kansas Branch Agric. Exp. Sta., Garden City]

The mite, *Oligonychus pratensis*, has in recent years been causing increasing concern to wheat

growers in western Kansas. Field trials of various insecticides in 1958 and 1959 on the variety Wichita revealed the transient nature of initial control. Trithion at 0.5 lb and kelthane at 0.75 lb a.i./ac in 1959 gave the best control, 94% after 14 days. Aerial spraying with parathion at 1 lb a.i./ac gave good control and a substantial increase in yield of grain.—R.H.F.

1593 RIVIÈRE, J. Étude de la rhizosphère du blé. [Study of the wheat rhizosphere.] *Ann. agron., Paris* 1960, **11**, No. 4, 397–440, bibl. 85, illus., English, Russian and German summaries. [Inst. Nat. Agron., Paris]

The rhizosphere effect is strongest at the end of tillering, considerable at earing, and weak or absent during the other growth stages; it consists of a stimulation of most soil micro-organisms. [See also *Fld Crop Abstr.* 13 : 1063.] F. s.—E.B.O.

1594 ŚLABOŃSKI, A. and LIPIŃSKA, D. Badania nad odpornością odmian pszenicy jarej na suszę. [Investigations on the drought-resistance of spring wheat varieties.] *Hod. Róslin. Aklimat. Nasien. (Pl. Breed. Acclim. Seed Prod.)* 1960, **4**, No. 6, 669–88, bibl. 15, English summary. [Gorzón Wielkopolski, Poland]

In pot trials conducted from 1955–7 with 9 varieties of spring wheat, 6 different treatments were used to test the effect of drought at different stages of growth. Drought was most harmful at the stage between shooting and coming into ear, for all the varieties tested. F. Eng. s.—G.M.R.

1595 DIMOVA, R. [The influence of dry soil on the nutrition of the wheat plant during different phases of its development.] [Bulgarian] *Naučnye Trudy, Sofija (Sci. Papers, Dimitrov Agric. Inst., Sofia)* 1960, **8** (36), 201–30, bibl. 39, Russian and English summaries.

1596 KIRIČENKO, F. G. and ŠALIN, Ju. P. [Hardening against frost of some winter wheat varieties in relation to environmental conditions and phase of development.] [Russian] *Vestn. S.-H. Nauki (J. agric. Sci. USSR)* 1961, **6**, No. 6, 3–10, illus., English, German and French summaries. [All-Union Lysenko Inst. Pl. Breed. and Genet.]

1597 PAULI, A. W. and others. Relationship of cold-hardiness to soluble-protein-nitrogen content and epicotyl growth rates in winter wheat. *Crop Sci.* 1961, **1**, No. 2, 137–8, bibl. 9. [Kansas Agric. Exp. Sta., Manhattan, and Wyoming Agric. Exp. Sta., Laramie]

The survival of 21 varieties of winter wheat after freezing at 0°F for 24 hr was found to be correlated significantly ($r = +0.58$) with the

soluble-protein content of the foliage of unfrozen plants, but not with epicotyl length as determined from seedlings grown in mannitol under 3 different osmotic pressures.—R.H.F.

1598 CHANG, L. E.-H. **The amino acid and protein composition of certain varieties of wheat.** *Diss. Abstr.* 1960, **21**, No. 6, 1307. [Cornell Univ., Ithaca, New York State]

1599 AHUNBAEVA, B. O. and ISHAKOVA, N. A. **[Fructosans of wheat grain (during ripening).]** [Russian] *Biohimija (Biochemistry, Leningr.)* 1961, **26**, No. 1, 57–60, bibl. 15, illus., English summary.

1600 FRIEND, D. J. C. and others. **The influence of the ratio of incandescence to fluorescent light on the flowering response of Marquis wheat grown under controlled conditions.** *Canad. J. Pl. Sci.* 1961, **41**, No. 2, 418–27, bibl. 16. [Canada Dept Agric., Ottawa, Ontario]

When Marquis wheat is grown under artificial conditions, the main light energy (lamp watts) supplied by fluorescent light should be supplemented by at least 35% of incandescent light in order to have a photoperiodic effect close to the maximal. Increasing the percentage up to 100% resulted in slightly earlier flowering. This effect of incandescent light was caused, not by earlier floral initiation, but by an increase in the rate of stem elongation and hastening of the later stages of floral differentiation. This action of incandescent light could not be replaced by substituting pink fluorescent for one-third of the white fluorescent lights. To obtain a photoperiodic effect equal to that of high light energy from combined fluorescent and incandescent bulbs, it is recommended that the daylength be extended by sufficient incandescent light to give an intensity of at least 50 f.c. at plant level. F. s.—R.B.

1601 CHING, T. M. and FOOTE, W. H. **Post-harvest dormancy in wheat varieties.** *Agron. J.* 1961, **53**, No. 3, 183–6, bibl. 14. [Oregon Agric. Exp. Sta., Corvallis]

The immediate post-harvest germination of 10 varieties of wheat was studied. Dormancy was demonstrated in 4 varieties. Storage for 4 weeks at 38°C and 15% RH broke the dormancy. Studies of moisture uptake and respiration revealed similar patterns in seeds of both dormant and non-dormant varieties and it was concluded that neither an impermeable testa nor a high moisture content was responsible for the dormancy effect. Further investigation revealed the presence of growth inhibitors in the dormant seed.—R.H.F.

1602 KONOVALOV, Ju. B. **[The development of spring-wheat grains in relation to**

meteorological conditions.] [Russian] *Izv. Timirjazevsk. S.-H. Akad. (Bull. Timirjazev agric. Acad.)* 1961, No. 2 (39), 26–39, bibl. 22, English summary.

1603 KOEDŽIKOV, H. **[The effect of a preceding crop on the biology of hard wheat.]** [Bulgarian] *Nauchne Trudy, Sofija (Sci. Papers, Dimitrov Agric. Inst., Sofia)* 1960, **8** (36), 129–53, bibl. 4, illus., Russian and German summaries.

1604 PETR, J. **Biologie českých přesívek I. Studium fyziologické podstaty přesívkovosti. [Biology of the Bohemian interchangeable wheat varieties. I. The physiological nature of the interchange-character.]** *Rostlinná výroba* 1960, **6** (33), No. 11, 1473–1500, bibl. 57, illus. [Vysoká Škola Zeměd., Prague]

The interchangeable wheat varieties, grown in Bohemia from time immemorial, can be sown with equal success in autumn (when they prove to be among the most winterhardy of the Czech wheat varieties) or in spring up to the end of April. Their temperature- and light-requirements, as compared with those of typical winter and spring wheat forms, place them in an independent group of varieties with distinct biological characteristics. They have no vernalization requirement and are independent of a wide range of temperatures. In photoperiodic experiments reaction began as soon as the plant emerged, and the varieties proved very sensitive to a shortening of daylength for 42–47 days; this retarded development, produced a prostrate growth in early stages, intensified and prolonged tillering, and resulted in some morphological changes. These wheats reacted to daylength in a similar fashion to the semi-winter wheat Stupitz Hybrid. F. Ger. s.—G.M.R.

1605 WAS, L. **Badania nad sztywnością słomy różnych gatunków pszenic. [Experiments on stiffness of straw in different wheat species.]** *Hod. Róslin. Aklimat. Nasien. (Pl. Breed. Acclim. Seed Prod.)* 1960, **4**, No. 6, 689–712, bibl. 26, illus., English summary. [Exp. Sta. Grodkowice, Poland]

Of 3 methods used for estimating the stiffness of straw in different winter-wheat varieties of Grodkowice origin, Grafius and Brown's method [see *Fld Crop Abstr.* 8 : 406] was the most effective. Suitable morphological characters were: mean thickness of culm, culm thickness/length ratio, thickness of sclerenchyma layer/culm ratio, the mean quantity of parenchyma islets in 1 mm sclerenchyma, and the mean thickness of the culm wall in the second internode from the top. F. Eng. s.—G.M.R.

1606 MATHON, C.-C. and STROUN, M. **Effet de la gibberelline sur le développement des**

Graminées annuelles. [Effect of gibberellin on the development of the annual Gramineae.] *C.R. Soc. Biol., Paris* 1960, **154**, No. 5, 1059-60.

GA was applied to wheat plants in continuous light, and in short- and long-day, and to barley plants in long day, at different stages of development. The general conclusions were that GA had no effect on date of earing and that treated plants were always taller than the controls. Early treatment in one case hastened temporarily the morphogenesis of the primordia but this exhausted the plants, while late treatment in another case resulted in sterile ears.—E.B.O.

1607 MULLALY, J. V. and MOSS, H. J. The dependence of wheat quality tests on protein level—a comparative study of some Australian varieties. *Aust. J. exp. Agric. anim. Husb.* 1961, **1**, No. 1, 46-55, bibl. 13, illus. [Dept Agric., Victoria]

Six commonly used wheat quality tests (baking performance, water absorption, dough-development time, valorimeter number, extensibility, and resistance to extension) have been examined for their abilities to characterize and discriminate among wheat varieties. Twelve Australian varieties over a wheat-protein range of 7.5-14.5% are considered. The recovery of wheat protein in the flour was also examined for 8 of the varieties. In most cases, the tests clearly distinguished between the hard and soft varieties, and within these groups suggestions are made and specifications are described for variety quality standards.—J.D. [CSIRO]

1608 SINEV, A. K. [Biological and agro-technical evaluation of wheat and barley grain from plants of differing productivity.] [Russian] *Izv. Timirjazeusk. S-H. Akad.* (Bull. Timirjazev agric. Acad.) 1961, No. 1 (38), 60-75, English summary.

1609 BALLATORE, G. P. Il problema del grano duro. [Durum wheat (in Sicily) and its problems.] Paper read at Conv. Tec.-Econ. Agric. Siciliana, Palermo, April, 1960 pp. 19.

1610 KLIMOV, Ja. I. [Prospects of increasing the production of durum wheats in the southern Ural.] [Russian] *Vestn. S-H. Nauki (J. agric. Sci. USSR)* 1961, **6**, No. 3, 34-9, English, French and German summaries. [Čeljabinsk State Agric. Exp. Sta.]

OATS

1611† THURMAN, R. L. Small grain management experiments, fall 1956 through spring 1960. *Rep. Ser. 93 Arkansas agric. Exp. Sta.* 1960, pp. 24, bibl. 5.

Experiments were conducted during 4 seasons at 4 centres on the use of oats and wheat for forage. The oats were also grown on for grain. The grain yield of oats was the same whether the seed bed was ploughed in July, Aug. or Sept. or disced in Sept., but forage yields were best after ploughing in July or Aug. because summer rainfall was better conserved. There was a positive relationship between germination percentage and seedling weight, 80% germination being required for the best forage yields. Higher seed rates did not compensate for poor germination. Forage yields were increased by oversowing with pearl millet or Sudan grass, when the sowing was done in good time, but intersowing oats with ryegrass reduced the grain yield of the oats by 50% without improving forage yield. After a basal dressing of NPK at sowing time, an extra 40 lb N/ac increased forage yields by 25% (mainly in the later cuts), but the response was greatly influenced by moisture, variety, sowing date and temperature. Growth in the autumn and winter was more dependent on soil moisture than on any other factor, and rainfall in the first 10 weeks after emergence (Sept.-Nov.) was critical. Sowing in Oct. was too late, because growth ceased below 45°F, and Aug. was too early because temperatures were too high. Sowing on 1 Sept. is recommended for the north of Arkansas and on 15 Sept. for the south. Recommendations are also made for choice of variety in different areas. Certain soft wheats gave better yields than oats, but Hessian fly was a risk. Forage yields increased in the ratio 1 : 2 : 3 depending on whether the first cut was made when the plants were 4, 6 or 8 in. high, and it was concluded that cutting did not stimulate regrowth. Excess soil moisture did not seriously injure wheat, but it killed the Arkwin variety of oats, whilst other varieties of oats and barley showed varying degrees of tolerance depending on temperature.—J.D.J.

1612 PFEIFER, R. P. and KLINE, J. P. A major cause of winterkill of winter oats. *Agron. J.* 1960, **52**, No. 11, 621-3, bibl. 5, illus. [Pennsylvania Agric. Exp. Sta., University Park]

The relation between low temperature and injury to oat seedlings of different age and variety was studied under field and laboratory conditions during the winters of 1956-7 and 1958-9. When the soil temperature at 1 in. depth reached 11°F, all varieties were killed, whereas at 22°F early sowings (10 Sept.) of one variety [not named] suffered little more than half the mortality of later sowings (28 Oct.).—R.H.F.

1613 DODDS, M. E. The effect of swathing at different stages of maturity on the bushel weight and yield of oats. *Canad. J. Pl.*

Sci. 1961, **41**, No. 2, 401–6, bibl. 19. [Canada Dept Agric., Swift Current, Saskatchewan]

Swathing tests were conducted over a 4-year period to determine the earliest stage of maturity at which oats could be cut without loss of bushel weight or yield. Cutting started when the grain moisture-content of the standing crop approximated 50% and continued daily until the moisture content reached 14%. The weight per measured bushel, 1000-grain weight, and yield in bushels per ac were determined at the time the swath was picked up and threshed with the combine. An analysis of variance of the data indicated that oats may be swathed at a stage of maturity defined by a grain moisture-content of 35% without affecting bushel weight or yield. Grain moisture at swathing was significantly, negatively correlated with the bushel weight, 1000-grain weight, and yield for the full range of the test, but this relationship became of a lower order as maturity advanced and was not correlated at a moisture level below 35%. F. s.—R.B.

1614 KLEBESADEL, L. J. and SMITH, D. **Effects of harvesting an oat companion crop at four stages of maturity on the yield of oats, on light near the soil surface, on soil moisture, and on the establishment of alfalfa.** *Agron. J.* 1960, **52**, No. 11, 627–30, bibl. 14. [Wisconsin Agric. Exp. Sta., Madison]

In a replicated field experiment Clinton oats were sown in 1955 and Clintland in 1956 and 1957 at 2 bu/ac and then oversown with lucerne at 10 lb/ac. The herbage was cut when the oats were at 1 of 4 stages: (1) whenever the leaves reached a height of 12–16 in. (3 harvests), (2) booting (2 harvests), (3) early dough, (4) grain maturity. The average yields of oats as D.M. and protein, respectively, in lb/ac from each treatment were: (1) 2622 and 639, (2) 3227 and 601, (3) 5596 and 693, (4) 5392 and 421. Soil-moisture depletion was greater in treatments (3) and (4) than in (1) and (2). Treatments (1) and (2) had negligible shading effect but (3) and (4) resulted in heavy shading of the lucerne. The yield of lucerne in the following spring was not affected by time of cutting the companion oat crop.—R.H.F.

1615 BAIN, R. and MORRISON, D. **Oats — varieties, sowing dates and seed rates.** *Scot. Agric.* 1961, **41**, No. 1, 18–21. [North of Scotland College of Agriculture]

Varieties suitable as companion crops for grass seeds mixtures and for harvesting by binder or by combine are discussed. The results of date-of-sowing trials are reported for the varieties Victory (1925–58) and Forward (1953–60) in which weekly sowings were made from 1 March to 3 May. Victory could be sown any time in the 1st half of March without undue loss in yield while Forward, an earlier ripening variety, could be

sown any time in March. The later after early March that sowings were made, however, the greater was the possibility of lodging. Trials with the variety Sun II at 6 sites in 1956–8 showed the optimum seed rate, after a ley or on clean land, using a combine drill, to be 5 bu/ac. Severe lodging occurred when seed-bed N was increased from 10 to 30 lb/ac.—R.H.F.

1616† SEED WORLD. **Curt red oat.** *Seed World* 1961, **88**, No. 10, 10.

This new short-strawed variety is adapted to pasture and hay production in California and is capable of yielding over 100 bu grain/ac. It is resistant to yellow-dwarf and stem-rust diseases, to shattering and to lodging.—R.H.F.

1617 JENSEN, N. F. **Oneida oats — new disease-resistant variety.** *Fm Res.* 1960, **26**, No. 1, 15, illus. [Cornell Univ. Agric. Exp. Sta., Ithaca, N.Y.]

Oneida is a new mid-season spring oat recommended for New York State. It stands well under moderate to high fertility conditions. Its yield was equal or superior to that of 6 out of 7 other varieties tested, being exceeded only by Garry. It is tolerant of black stem disease (*Septoria avenae*) and resistant to smut [*Ustilago avenae* and *U. kollerii*] and several races of stem rust.—A.M.H.

1618 MURPHY, H. C. **Registration of oat varieties.** *22. Agron. J.* 1960, **52**, No. 11, 663–5, bibl. 26. [Crops Res. Div., USDA]

The following varieties are described: Ajax, Clarion, Garry, Moregrain, Rodney, Simcoe, Macon, Curt and Nehawka.—R.H.F.

1619 MISSISSIPPI AGRICULTURAL EXPERIMENT STATION. **[Small grains.] Rep. Miss. agric. Exp. Sta.** 1958–9 [n.d.], **72**, 15–16, 51, 75.

When N at 60, 90 and 120 lb/ac was applied to oats for grain, a single application in March was as effective as applying half in March and half in April. At the Brown Loam Branch Station, oats were the most dependable small-grain crop. The leading varieties over a 3-year period were Arlington, Alamo, Delta Red 88, Victorgrain and Nortex 107, with yields of 66–77 bu/ac. Yields of wheat ranged from 20 to 40 bu/ac and those of barley from 7.6 to 34 bu/ac. In oat variety tests at the South Mississippi Branch Station, the top-yielding varieties were Moregrain (77 bu/ac), Suregrain (67 bu/ac), Delta Red 88 (64 bu/ac) and Nortex 107 (59 bu/ac).—A.M.H.

1620 RICHES, J. **Damage to the oat panicle by the frit fly.** *Ent. exp. et appl.* 1960, **3**, No. 3, 173–84, bibl. 25, illus. [Rothamsted Exp. Sta., Harpenden]

About 2000 panicles (60,000 spikelets), of known bursting date, from small plots of oats were dissected in detail. It is noted that spraying young oat plants with DDT against first generation attack by *Oscinella frit* also reduces panicle attack. The spraying causes physical differences between the sprayed and the unsprayed areas, namely, spraying gives a higher plant density and uniformity of panicle bursting date. The liability of main grain rather than a bosom grain to be attacked is noted at different levels of overall attack. Blindness in oats is discussed, and data are given to support the theory that one type of blindness is due to early frit-fly attack on the immature grain. F. s.—R.B.

1621 DRENNAN, D. S. H. and others. **Prevention of manganese deficiency in oat by soaking the grain in solutions of manganous chloride.** *Nature* 1961, **190**, No. 4778, 824. [Dept Bot., Univ. Glasgow and W. of Scotland Agric. Coll.]

The author found that oats soaked in a 2% solution of $MnCl_2$ for 8 or 24 hr and then grown in a culture solution did not exhibit grey speck. In preliminary trials in 1959 to test seed-soaking treatments under field conditions manganese-deficiency symptoms were not obvious in oat plants grown from treated seeds, whereas plants from untreated control seeds showed typical grey speck and reduced growth.—A.G.G.H.

1622 MCGREGOR, A. J. and others. **Placement of manganese sulphate for control of manganese deficiency in oats [in Scotland].** *Fertil. Feed. St. J.* 1960, **53**, 313–17, 319, illus.

1623 SZEPIENIEC, A. Badania procesu napełniania ziarna kilku odmian owsa na tle zawartości wody w liściach i łodydze. [Grain-swelling process in several oat varieties in relation to the water content of leaves and stems.] *Hod. Róslin. Aklimat. Nasien. (Pl. Breed. Acclim. Seed Prod.)* 1960, **4**, No. 5, 513–24, bibl. 3, English summary.

The water content of leaves, culms and grain of 3 oat varieties was studied under field conditions. There was no varietal difference in loss of water from the leaves until the end of the vegetative period, when Udycz Żółty lost water the earliest and most rapidly. This variety had the lowest grain-moisture content. The swelling of grain developed uniformly in all the varieties up to a maximum, which occurred at the stage when the leaves began to lose water, and it varied in rate in the different varieties. The plant parts lost water in the following order: grain (most rapidly); leaves; upper, and finally the lower, part of the culm. F. Eng. s.—G.M.R.

RYE

1624 LISTOWSKI, A. and DOMAŃSKA, H. O wpływie suszy jesiennej i wiosennej na rozwój żyta i jęczmienia ozimego. **The influence of the autumn and spring drought on the development of winter rye and barley.** *Roczn. Nauk rol.* 1960, **83**, Ser. A, No. 2, 229–41, bibl. 10, English summary.

Winter survival was higher, and spring growth was stimulated, when plants of rye and barley were grown in soil having a moisture content of 25% as compared with 60–70% field capacity during the autumn. F. Eng. s.—G.M.R.

BARLEY

See also Abs. 1589, 1606, 1608, 1619, 1624, 1777.

1625 REISENAUER, H. M. and DICKSON, A. D. **Effects of nitrogen and sulfur fertilization on yield and malting quality of barley.** *Agron. J.* 1961, **53**, No. 3, 192–5, bibl. 13. [Washington Agric. Exp. Sta., Pullman]

Hannchen, a malting barley, was sown at various sites in a 2-yr study, in rows 12 in. apart and with fertilizer placed 1 in. below and 1 in. to the side of the seed. N, as ammonium sulphate, was applied at 0, 40, 80 and 120 lb/ac and S, as gypsum, at 0 and 20 lb/ac in factorial combination. N at 80 or 120 lb/ac increased grain protein above the acceptable limit for malting. S had no effect on grain N. The diastatic power and α - and β -amylase activities all increased with increasing N. Their effect was significantly increased in the presence of S.—R.H.F.

1626 MARTIN, W. E. and MIKKELSEN, D. S. **Grain fertilization in California. Effects of fertilization on grain [barley] quality.** *Bull. 775 Calif. agric. Exp. Sta.* 1960, pp. 39, bibl. 4, illus.

Test weight of barley was found to vary with variety, weather and level of soil fertility. The official (USA) standard is 48 lb/bu. Samples taken in 1948 and 1949 from fertilizer trials showed that when soil moisture was adequate, the addition of N (at 0, 15, 30 and 45 lb/ac) or N + P (at 40 and 80 lb/ac) had little effect. When a spring drought prevailed, however, N at 45 lb/ac reduced the value from 45.3 to 43.6 lb/bu and P again had little effect. In soils of known P deficiency, P alone at from 0–40 lb/ac increased the test weight from 45.3 to 47.6 lb/bu, but at each level of P the addition of N at 40 lb/ac reduced it by an average of 2.9 lb/bu. The crude protein was similarly influenced. The effect of P was to reduce CP by up to 2.9% units when 80 lb $[P_2O_5]$ /ac was applied to a soil acutely deficient in P. The indirect effect of fertilizing with N and P on

malting quality was shown to be the increased diastatic power and reduced malt extract resulting from increasing CP.—R.H.F.

- 1627 WELLS, S. A. and others. **Note on Palliser barley.** *Canad. J. Pl. Sci.* 1961, **41**, No. 2, 440-1.

Palliser 2-rowed barley, a cross between Vantage and Compana, is described. In 49 tests on the Brown and Dark Brown soils of Alberta and Saskatchewan it outyielded Compana by 7% and Vantage by 3%. The malting and pearling quality of the grain was not as good as that of Hannchen.—R.B.

- 1628 SARQUIS, A. V. **Geographic origin of barley seed produces no effect on yield.** *Calif. Agric.* 1961, **15**, No. 4, 3.

Certified and graded seed of California Mariout barley, grown each year at Davis, Coalinga and El Centro, was sown in trials in Fresno County for 3 seasons. There was no significant difference in yield in any year nor for the average of 3 years. The same result was obtained in 1959 from Arivat barley, the seed of which was grown at Woodland and Coalinga in California and Yuma in Arizona.—R.H.F.

- 1629 SUNESON, C. A. and others. **Blanco Mariout barley.** *Calif. Agric.* 1961, **15**, No. 6, 7-8.

This new variety is described. Its main attribute is a colourless aleurone layer which gives rise to a white milled grain. It is expected to replace California Mariout which has a bluish aleurone layer.—R.H.F.

- 1630 LAMBERT, J. W. **Registration of barley varieties, 15.** *Agron. J.* 1960, **52**, No. 11, 661-2, bibl. 4. [Minnesota Univ.]

The following varieties are described: Arivat, Forrest, Freja, Heines Hanna and Liberty. [See also Abs. 1632].—R.H.F.

- 1631 NEW JERSEY AGRICULTURAL STATION. **New winter barley is ready for 1961.** *N. J. Agric.* 1961, **43**, No. 1, 11.

The variety Early Wong is to be released in 1961. It matures up to 7 days earlier than Wong [a currently grown variety], yields about 5% lower, and has a higher bushel weight (46.9 lb).—R.H.F.

- 1632 WIEBE, G. A. and REID, D. A. **Classification of barley varieties grown in the United States and Canada in 1958.** *Tech. Bull. 1224 Agric. Res. Ser. USDA* 1961, pp. 234, bibl. 109, illus.

Barley is the 4th most important cereal in the

North American continent. This publication is a successor to Tech. Bull. No. 907, published 1946, and gives much of the information contained therein. It gives a key and detailed morphological description, history, distribution and some agronomic features of 53 winter- and 112 spring-varieties. The cultivated forms of the genus *Hordeum* are described, and details of the taxonomic characters, vegetal and floral, used for the classification are clearly presented. [See also *Fld Crop Abstr.* 1: 1060.] —R.H.F.

- 1633 JACKOWSKA, I. **Wskaźniki morfologiczne rozwoju jęczmienia jarego.** [The morphological indices of spring barley development.] *Hod. Róslin. Aklimat. Nasien. (Pl. Breed. Acclim. Seed Prod.)* 1960, **4**, No. 6, 651-68, bibl. 21, English summary. [Puławy, Poland]

Observation over 5 yr showed that under optimal environmental conditions the spring barley variety Skrzyszowicki always forms 9 leaves on the main shoot. The successive leaves appear and develop simultaneously with the successive phases of differentiation of the growing point and serve as morphological indices of the plant's development. These indices are summarized under 13 heads showing the parallel changes occurring in the growing point. F. Eng. s.—G.M.R.

- 1634 THORNE, G. N. **Photosynthesis by ears of Proctor and Plumage Archer barleys.** *Rep. Rothamsted exp. Sta. 1960 Harpenden*, 1961, 97-9.

Newly emerged heads, selected at random in a field of each of the 2 varieties, were covered with an opaque shade, and the yield of grain subsequently compared with that from unshaded heads. The reduction in grain yield/ear by shading was, for Proctor 39%, and for Plumage Archer 15%. The number of grains/ear in Proctor and the 1000-grain weight of both varieties were decreased by shading. In another experiment, shading of the ears had a similar effect on both varieties; it decreased ear weight by 33%, stem weight by 8% and increased leaf-area duration, between emergence and maturity, by 8%. Direct measurement of the CO₂ regime (uptake by photosynthesis and loss by respiration) showed that, in both varieties, photosynthesis in the ear contributed 30% to its final dry weight; of this, 45% was actually contributed by photosynthesis but respiration caused a loss of 15%. Reasons for the discrepancy between the observed reduction in ear weight (15-30% in numerous experiments) and measured photosynthesis contribution (45%) are discussed.—R.H.F.

- 1635 MIDDLETON, G. K. and others. **Varietal differences in protein content of barley.** *Agron. J.* 1961, **53**, No. 3, 206, bibl. 2. [North Carolina Agric. Exp. Sta., Raleigh]

The protein content of the grain of 18 varieties of barley grown for feed at 13 sites in 1957-8 ranged from 9.45-10.93% and was not correlated with yield.—R.H.F.

1636 ORCHARD, B. **Effects of drought on plant growth.** *Rep. Rothamsted exp. Sta.* 1960 Harpenden, 1961, 95-6.

Proctor barley was subjected to a series of moisture regimes in the presence or absence of N. Under drought conditions, reduced dry-matter production was found to be caused by a reduction in leaf area while net-assimilation rate was unaffected. Watering after drought induced new shoot production and a spurt in growth rate owing to delayed senescence of leaves (thus increasing effective leaf area); net-assimilation rate was again unaffected. Drought had more severe effects on fertilized plants but they recovered more rapidly when watered.—R.H.F.

1637 KEMPER, W. D. and others. **Growth rates of barley and corn as affected by changes in soil moisture stress.** *Soil Sci.* 1961, 91, No. 5, 332-8, bibl. 7. [Colorado Agric. Exp. Sta., Fort Collins]

The retarding effect of temporary moisture stress on growth rate was partially compensated by a rapid growth rate following a release of this moisture stress. The rapid growth rate following release of soil-moisture stress is tentatively attributed to increased turgor pressure in the cells and an accumulation of simple sugars during the previous period of large stress. This growth rate decreased by more than 50% from its maximum value within 4 days of the time when moisture stress was released. This decrease is attributed to lowered turgor pressure and carbohydrate availability, caused by a depletion of sugar content to normal levels and a deficiency of other materials, necessary for growth, caused by the previous period of rapid growth. This phenomenon was noted in lucerne, barley, and maize, and is, therefore, presumed to be fairly general in nature. F. s.—R.H.F.

1638 STARZYCKI, S. and SZEPHENIEC, A. **Badania procesu napełniania ziarna pięciu odmian jęczmienia jarego na tle zawartości wody w łodydze i liściach. [Grain-filling process in five spring-barley varieties in relation to the water content of stems and leaves.]** *Hod. Róslin. Aklimat. Nasien. (Pl. Breed. Acclim. Seed Prod.)* 1960, 4, No. 5, 503-11, bibl. 2, English summary.

The accumulation of dry matter in the grain of 5 spring-barley varieties was studied in relation to the percentage water content of the leaves, the upper and lower parts of the culms, and the grain. The varieties lost water to a different degree during swelling of the grain. At the wax-ripe stage (grain

moisture content 32-48%), translocation of water through the culm was greatly reduced, with the upper part of the culm losing water more rapidly than the lower part. During this period a decrease in 1000-grain weight was observed, a finding which may contribute to a more precise determination of the time for harvesting cereals. F. Eng. s.—G.M.R.

MAIZE

See also Abs. 1637, 1924, 1981.

1639 MISSISSIPPI AGRICULTURAL EXPERIMENT STATION. [Maize.] *Rep. Miss. agric. Exp. Sta.* 1958-9 [n.d.], 72, 6, 9, 10, 51, 53, 62, 73, 75. [Received April, 1960]

In studies carried out over 6 years, conventional seed-bed preparation and cultivation gave an average maize yield of 81 bu/ac, while maize mulch-sown in crimson clover gave an average yield of 84 bu/ac. Surface drainage did not give good maize production on a heavy clay soil when excessive rain in June and July kept soil moisture high. At Mississippi State University in conditions of excessive moisture the maize yield on a graded field was 22 bu/ac, while that on an ungraded row-drained field was 12 bu/ac. At the Brown Loam Branch Station, in a graded field which produced an average of 93 bu/ac, the filled areas produced 33 bu/ac more than the cut areas because of better stands. Placing fertilizer in direct contact with maize seed reduced the stand by over 20% and the yield by 10 bu/ac. The best fertilizer placement was in a band 2-3 in. to the side of, and 2-3 in. below, the level of the seed. Granular and spray forms of aldrin, dieldrin and heptachlor were effective in controlling sugar-cane beetle [*Eutheola rugiceps*], southern corn root worm [*Diabrotica undecimpunctata howardi*] and wireworm in maize. Treating soil with 1 lb aldrin or heptachlor/ac reduced insect damage from 62 to 2%. These insecticides were still effective in the 3rd year after application. At the Delta Branch Station, simazin, Geigy 30028 and Geigy 30451 used as pre-emergence herbicides gave excellent control of early-season broad-leaved weeds. Simazin and diuron gave the best control of grasses. Significant injury to the maize was caused only by the highest rates of diuron and 2,4-D. MCPA, Geigy 30031, 4-(2,4-DB) and 2,4-DES, applied at post-emergence, gave significant control of late-season weeds with no adverse effects on yield. When maize and soybeans were interplanted at different N rates no yield increase resulted from exceeding 120 lb N/ac. Interplanting with soybeans reduced maize yield by an average of 8.3 bu/ac.—A.M.H.

1640 COLLINGS, D. F. **Ridging and mulching trial [with maize].** *Progr. Reps Exp. Stas*

Emp. Cott. Gr. Corp., Nyasaland 1959-60 1961, 7-8. [Makanga, Nyasaland]

Yields are given, in lb shelled maize/ac, for the following main treatments: flat cultivation, 1337; ridged, 1553; ridged and cross-tied, 1767; no mulch, 768; light mulch, 1857; heavy mulch, 2034. As with a similar trial with groundnuts in the previous season [see *Fld Crop Abstr.* 13: 1748] both ridging and mulching gave substantial increases in yield.—R.H.F.

641 PUENTE, B. A. and others. Ensayo de maíz tropical con tres variantes. Combate de hierbas, distribución de semilla, abonado. [Trials with tropical maize using three variables: weed control, spacing and fertilizers.] *Agricultura téc., Méx.* 1960, No. 10, 4-7, illus. [Sec. Agríc. Ganad., Campo-Cotaxtla, Veracruz, Mexico]

The hybrid maize H-503 was sown to give 40,000 plants/ha with 3 in-the-row spacings: 4 plants/m, 2 plants every 50 cm, 1 plant every 25 cm. Weed control was effected by (a) 2,4-D ester pre-emergence applied over all the area at 4 l formulation/ha, (b) in a band 30 cm wide over the seed-row and using a third of the above rate and (c) mechanical cultivation 15 days after seedling emergence (when plants were 15-20 cm high). Results showed no significant difference in grain yield between any of the above treatments.—R.H.F.

642 RAMÍREZ, P. F. and LAIRD, R. J. Densidad optima de plantas de maíz para los Valles de México y Toluca. [Optimal plant density for maize in the Mexico and Toluca Valleys.] *Tol. téc. No. 42 Sec. Agríc. Ganad., Méx.* 1960, pp. 27, bibl. 12, English summary.

In experiments conducted during 1954-9, with irrigated and non-irrigated hybrid maize at 4 levels of N, a positive linear relationship was established between yield and plant density. With irrigated maize, at the most economic rate of N used (120 kg/ha), maximum yield was obtained from a density of 50,000 plants/ac whilst maximum yield from unirrigated maize was obtained from 30 kg/ha and 60,000 plants/ac.—R.H.F.

643 ZUBER, M. S. and others. Rate-of-planting studies with prolific and single-ear corn hybrids. *Res. Bull. 737 Missouri agric. Exp. Sta.* 1960, pp. 20.

Five prolific [more than 1 ear/plant] and 6 single-ear type maize varieties were sown in a replicated experiment at 3 rates to give 8000, 12,000 and 16,000 plants/ac, at 3 locations for 3 years (1955-7). The plots were fertilized to produce a yield of 100 bu/ac. The results showed that a spacing of 12,000 plants/ac gave the highest yield for both types of hybrid and that the prolific types were the less affected by variations in plant

density. Yields for the 3 densities (in increasing order) for prolific and single-ear types, respectively, were, in bu/ac: 87.9, 94.3, 92.5 and 78.7, 91.2, 89.3.—R.H.F.

1644 NORDEN, A. J. Field corn production on flatwoods soil. *Rep. Fla agric. Exp. Stas 1959* [n.d.], 66. [Gainesville, Florida]

Hybrid varieties of maize were sown on flatwoods soils on 1 May 1958 to give stands of 8000 and 15,000 plants/ac, and were given 112 lb N, 84 lb P and 168 lb K [per acre]. The denser stand yielded 103 bu grain/ac, compared with 75 bu/ac for the less dense stand. Yield differences among varieties were not statistically significant. Although more ears were produced per plot by the denser stand, they were not significantly smaller than ears produced by the less dense stand. The number of ears per plant was 1.43 for the less dense stand and 1.04 for the denser stand, and the percentages of lodged plants were 6 and 10%, respectively.—R.B.

1645 STARKOVA, A. V. [Physiological characteristics of maize in different densities of the plant stand.] [Russian] *Izv. Akad. Nauk. Kazah. SSR (Bull. Acad. Sci. Kazah SSR)* 1961, No. 1 (10), 35-44, bibl. 19.

1646 GARD, L. E. and others. Moisture loss and corn yields on a silt-pan soil as affected by three levels of water supply. *Proc. Soil Sci. Soc. Amer.* 1961, 25, No. 2, 154-7, bibl. 11. [Illinois Agric. Exp. Sta., Urbana]

Maize was grown for 4 seasons, 1955-8, under 3 levels of water supply: (a) natural rain, (b) 2 in. of water applied by sprinkler at the early tassel stage and again 10-14 days later, and (c) weekly quantities so adjusted that irrigation + previous week's rainfall totalled 2 in. between the 7th and 12th weeks of growth. Owing to excessive rainfall the 3rd irrigation level could not operate in the 4th year. The total water disappearance (rainfall and irrigation + depletion of soil reservoir) and average yield of maize for 1955-7 for the low, medium and high water levels, respectively, were: 15.9 in. and 90 bu/ac; 18.55 in. and 117 bu/ac; 19.48 in. and 122 bu/ac. Soil-moisture extraction patterns are discussed and the water requirements of the crop during its growth are compared with the amount and distribution of rainfall in the area for the previous 21 yr. It was concluded that the medium level of irrigation, 4 in. during tasseling, gave the most economic return in 3 yr out of 4 and that in more than 1 yr in 2, rainfall is a limiting factor to maize yield.—R.H.F.

1647 SCIENCE FOR THE FARMER. Late maturing corn hybrid released. *Sci. Fmr* 1961, 8, No. 4, 14.

The maize hybrid Pa 825, which is described, combines high yield and resistance to lodging, corn aphid [*Rhopalosiphum maidis*] and European corn borer [*Pyrausta nubilalis*].—R.H.F.

1648 MÜLLER, H. W. and others. Ein Beitrag zur praxisgerechten Bewertung des Mais-saatgutes. [A contribution towards producing a standard practice for evaluation of maize seed.] *Z. landw. Vers- u. UntersuchWes.* 1960, 6, No. 2, 121-32, bibl. 19, illus., English and Russian summaries. [Inst. PflZücht., Bernburg, E. Germany]

Germination capacity as determined in the laboratory gave results 18% higher than seedling emergence in the field. Germinating-energy determinations agreed more closely with seedling emergence in the field. Good agreement between results obtained in laboratory and field were obtained when the seed was first stored for 21 days at a temperature of 8-9°C before being placed in a warm germinating room. This method has been used for selecting cold-tolerant types. F. Ger. s.—D.B.

1649 VALEVA, S. A. Effect of γ -rays and neutrons on dried seeds of agricultural plants [maize]. *Biophysics (USSR)* 1960 5, No. 3, 415-20. [Abstr. 10709 in *Nuclear Sci. Abstr.* 1961, 15, No. 9]

1650† HUGHES, R. G. Pre-emergence and post-emergence weed control in maize. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 121-32, bibl. 2.

Experiments on weed control in maize were carried out in Berkshire and Hampshire during 1959-60 using simazin as a pre-emergence herbicide and MCPA, 2,4-D triethanolamine and 2,4-D butoxyethyl ester as post-emergence herbicides. A classification of weeds of maize based on their susceptibility to simazin is given. Maize treated with more than 1.5 lb simazin/ac had a very healthy appearance. MCPA and 2,4-D gave satisfactory results where applied before the 5-6 leaf stage; later applications are likely to cause damage to the crop.—R.B.

1651 WISCONSIN AGRICULTURAL EXPERIMENT STATION. Corn and grain. *What's new in Fm Sci., Wis.* 1959, Pt 2, 28-42, illus.

When used for post-emergence weed control in maize, 1 lb atrazine/ac gave good control of green foxtail [*Setaria viridis*?] and redroot and was more effective than 2 lb simazin/ac applied at the same time. In pre-emergence tests, simazin gave the best weed control and highest maize yields and diuron, TBA and CDAA-T were moderately successful. Simazin, atrazine and propazine at 4-8 lb/ac, applied in autumn or early spring

before sowing maize, gave good control of quackgrass [*Agropyron repens*]. Aldrin and heptachlor granules [rates not given] placed in the seed row gave a 6.5% increase in maize yield which was attributed to control of wireworms. When the insecticide was carried in deep-placed fertilizer the yield increase was only 1.5%. Deep placement of fertilizer/insecticide mixtures also gave less effective control of rootworms than placing in the row.—A.M.H.

1652 STANFORTH, D. W. Responses of corn hybrids to yellow foxtail competition. *Weeds* 1961, 9, No. 1, 132-6, bibl. 7. [Iowa Agric. Exp. Sta., Ames]

Four maize hybrids ranging in maturity from early-adapted to late were sown in an experiment with 3 levels of N fertilizer on land heavily infested with yellow foxtail (*Setaria lutescens*). The yields of maize were recorded together with the dry weight of foxtail on each plot. The reduction in maize yield per cwt foxtail was calculated. The experiment was repeated the following year, and in both years the yield reduction of the late-maturing hybrid was about double that of the early-adapted hybrid, the ratio being greatest at the highest level of N.—J.D.J.

1653 NEZAMUDDIN, S. and RAHMAN, F. Chemical weed control in maize crop. *Indian Agric.* 1960, 4, No. 1, 50-3, bibl. 6. [Bihar Agric. Coll., Sabour, Bhagalpore]

Agroxone, fernoxone and crag herbicides were tested as pre-emergence herbicides for controlling weeds in a maize crop; all were equally effective. There was no appreciable difference in the yield, height, weed population and weed weight in the plots under different treatments. F. s.—D.B.

1654 CANDIA, Z. D. and YOUNG, W. R. Repelentes contra pájaros durante la germinación del maíz en el trópico. [Bird repellents for germinating maize in the tropics.] *Agricultura téc., Mex.* 1960, No. 10, 25-8, bibl. 9, illus. [Sec. Agric. Ganad., Campo Cotaxtla, Veracruz, Mexico]

Satisfactory prevention (<10% damage compared with >60% for control) of bird damage to germinating maize was obtained by dressing the seed with (a) 4% of thiram with or without a sticker, (b) 6% of a 1% solution of the sticker alone (Du Pont spreader sticker), and (c) 0.5 or 1.0% drinox (a liquid containing 30% aldrin).—R.H.F.

1655 SIEMASZKO, B. and PINOWSKI, J. Wpływ zaprawiania ziarna kukurydzy różnymi repelentami na stopień wyżerowania zasiewów przez ptaki krukowate. Effect of maize grain dressing with various repellents on the range

of damage to sown seed caused by birds (Corvidae). *Rocz. Nauk rol.* 1960, 83, Ser. A, No. 2, 391-401, bibl. 20, Russian and English summaries.

Of 5 repellents tested, only the tar preparation corbotox, at 700 g/100 kg of seed, gave satisfactory results. It was found to adhere to the grain for a long time, retaining its repellent properties. Only a very small percentage of corbotox-dressed grain was taken by birds. Germination was delayed by 1 day but not reduced. F. Eng. s.—G.M.R.

1656 COMBE, I. and CISNEROS, F. Comparativo de insecticidas para controlar los perforadores de las mazorcas del maíz. [Comparison of insecticides for controlling borers of maize ears.] *Agronomía, Lima* 1960, 27, No. 4, 347-9. [La Molina, Lima, Peru]

In a plot trial, 3 sprays of 0.6% sevin 50 WP, applied at 8-day intervals to maize ears during tassel emission, gave effective control of *Heliothis obsoleta* and *Pococera atramentalis*.—E.B.O.

1657 IGUE, K. and GALLO, R. J. Zinc deficiency of corn in São Paulo. *Publ. 20 IBEC Res. Inst., New York* 1960, pp. 18, bibl. 4, illus. [IBEC Res. Inst. Farm, Matão, Brazil]

Field experiments showed that the chlorotic symptoms (described) could be dispersed or prevented by spraying with 0.05% $ZnSO_4$, band-placing of 5 kg $ZnSO_4$ /ha mixed with the fertilizer at sowing, or by seed treatment with ZnO_2 at about 2 kg/ha. Yields were not always increased when symptoms were dispersed or prevented, and were generally of a low order.—R.H.F.

1658 RÖDER, W. Zur Keimungsphysiologie und Saatgutqualität von Maissorten. [The physiology of germination and seed quality of maize varieties.] *Z. landw. Vers- u. Untersuch.-Wes.* 1960, 6, No. 2, 105-20, bibl. 23, English and Russian summaries. [Inst. Acker- u. Pflbau, Hochschule für LPG, Meissen/Elbe, E. Germany]

The effect of 1000-grain weight and temperature (8, 12, 16, 20 and 24°C) on germination capacity and speed of germination were studied in 20 varieties of silage maize, 4 from Germany and the remainder from USSR, Hungary, Romania, Bulgaria and Yugoslavia. There was no relationship between 1000-grain weight and germination capacity. At 8°C, all varieties, but only 60% of the total seeds, germinated, and the seedlings died within a few days. With increase in temperature, the rate of germination increased at first rapidly, then the rate of increase fell off. Above 12°C, seed of imported varieties had a greater speed of germination than had German seed. This higher rate was attributed to the toothed character of the seeds, which gave them a greater water-absorptive capacity. From the results of these experiments it is

concluded that in Germany maize should not be sown before the last week in April, by which time the soil temperature reaches about 10°C. Taking the average of all tests, the germination capacity of German seed was 74.6% while that of imported seed was 93.2%, therefore a correspondingly higher seed rate is necessary when using German varieties.—D.B.

1659 BARTON, L. V. Life-span of frost-damaged corn seeds. *Contr. Boyce Thompson Inst.* 1960, 20, No. 7, 403-8, bibl. 10, illus. [Boyce Thompson Inst., New York]

Frost-damaged seeds (but otherwise of high germination) of 5 varieties of hybrid maize retained germination unimpaired for 9 yr in storage at -5°C in a closed container. Storage in an open container at -5°C in a saturated, or at 30°C in a dry, atmosphere gave a similar germination pattern over 9 yr in which viability was maintained above 80% for 5 yr and then fell rapidly. Storage at 30°C in a closed container resulted in a rapid fall in viability to nil in 3 yr. It was concluded that frost damage itself does not impair viability of maize.—R.H.F.

1660 LEECH, J. H. The growth and development of the primary root of *Zea mays*. *Diss. Abstr.* 1960, 21, No. 6, 1346. [Univ. Texas, College Station]

1661 POSTLETHWAIT, S. N. and NELSON, O. E. A square-stemmed corn plant. [Abstracted in] *Proc. Ind. Acad. Sci.* 1959, 69, 105-6.

A maize plant discovered in the genetic plots of Purdue University had a square stem and decussate arrangement of the leaves. Two infertile ear shoots occurred on opposite sides of the stem at each of 3 nodes. Viable pollen was collected.—R.H.F.

1662 SASS, J. E. The development of ear primordia of *Zea* in relation to position on the plant. *Proc. Iowa Acad. Sci.* 1960, 67, 82-5, bibl. 3, illus. [Iowa Agric. and Home Economics Exp. Sta., Ames]

The development of axillary buds in a yellow dent maize hybrid was studied. Seven buds at acropetally successive nodes survived at least to 68 days after sowing and became pistillate inflorescences. Meiosis occurred in the basal ovaries of the upper 2 ears after 68 days, when the styles were 2 mm long, and complete embryo sacs were present by 71 days. The 2 upper ears attained approximately the same morphological and cytological stage between 68 and 71 days. The top bud invariably became the harvestable ear. The failure of complete development of the second ear is not ascribed to inadequate ovule development by the time of anthesis, nor to failure of pollination of this

ear, but to factors associated with competition prior to, and after, anthesis. F. s.—R.H.F.

1663 HAGEMAN, R. H. and others. **An improved nutrient culture technique for growing corn under greenhouse conditions.** *Agron. J.* 1961, 53, No. 3, 175-80, bibl. 20. [Univ. Illinois, Urbana]

1664 MUSGRAVE, R. B. and MOSS, D. N. **Photosynthesis under field conditions. 1. A portable, closed system for determining net assimilation and respiration of corn [maize].** *Crop Sci.* 1961, 1, No. 1, 37-41, bibl. 4. [Cornell Univ., Ithaca, New York State]

1665 MOSS, D. N. and others. **Photosynthesis under field conditions. 3. Some effects of light, carbon dioxide, temperature, and soil moisture on photosynthesis, respiration, and transpiration of corn.** *Crop Sci.* 1961, 1, No. 2, 83-7, bibl. 10. [Cornell Univ. Dep. Exp. Fm, Aurora]

Determinations of assimilation rate as measured by CO_2 uptake were made on field maize in 1958 using portable assimilation chambers. (1) A high correlation ($r = +0.95$) was established between insolation and assimilation, the latter being nil at 500 f.c. measured above the level of the crop. (2) When concentrations of CO_2 over the leaf surface were varied from 30 to 510 ppm, there was a continuous increase in assimilation with light intensity at the higher but not at the lower levels. At higher concentrations of CO_2 , transpiration and stomatal apertures were reduced. (3) Measurements of CO_2 production from the soil indicated that, at an average rate of 3.5 lb/ac/hr, this source supplied only 5% of the requirement of the crop during the 5-6 hr of peak mid-day demand. (4) Over a temperature range of 68-111°F, respiration was 8% higher in a chamber maintained at 7.5°F above that of a second chamber. At 36°F no respiration was observed. Although increasing with temperature, it was considered that respiration would not greatly reduce dry matter under local conditions when maximum day temperature is < 100°F and night < 75°F. (5) A marked reduction in assimilation was demonstrated for a maize plant growing under moisture stress.—R.H.F.

1666 ANDREENKO, S. S. and ALEHINA, N. D. **[Changes in photosynthesis and in the content of some forms of carbohydrates in maize plants under different pH values of the growth medium.]** [Russian] *Vestn. Moskov. Univ. (J. Moscow Univ.) Biol. Ser.* 6, 1961, No. 1, 32-9, bibl. 10.

1667 NAMKEN, L. N. and LEMON, E. R. **Field studies of internal moisture relations**

of the corn plant. *Agron. J.* 1960, 52, No. 11, 643-6, bibl. 19. [Aurora Exp. Sta., N.Y.]

Measurements were made before 8 a.m. on various occasions during an 8-week period, of electrical conductivity at stem base [method described in *Fld Crop Abstr.* 12 : 379] and of relative turgidity of mature leaves [method described in *Fld Crop Abstr.* 3 : 1501] in maize growing in irrigated and non-irrigated field plots. Values for conductivity were far more sensitive to moisture stress in the plant during the previous 24 hr than were turgidity measurements. This was shown to be due to the recovery of leaf turgor, at the expense of stem moisture, during the early hours of the morning prior to sampling. It was concluded that electrical conductivity of maize tissue is associated inversely with hydration in the cell wall.—R.H.F.

1668 FRITSCHEN, L. J. and SHAW, R. H. **Transpiration and evapotranspiration of corn as related to meteorological factors.** *Agron. J.* 1961, 53, No. 2, 71-4, bibl. 9. [Iowa Agric. Exp. Sta., Ames]

In a field experiment with maize in 1959 transpiration was measured as soil-moisture losses from plastic-covered plots, and evapotranspiration as soil-moisture losses from natural plots. The difference between these 2 quantities was intended to be a measure of evaporation from natural plots, but ancillary records of soil temperature, net radiation, and crop maturity indicated that differences in microclimate existed to upset the validity of this simple subtraction. Net radiation measurements taken above and below the maize canopy indicated that the crop on natural plots intercepted some 20% more energy than the crop on plastic-covered plots. The figure for transpiration from the plastic-covered plots was therefore increased by this amount before making the subtraction. This adjustment raised the ratio of transpiration to evapotranspiration from 0.73 to 0.89.—J.D.J.

1669 FRITSCHEN, L. J. and SHAW, R. H. **Evapotranspiration for corn as related to pan evaporation.** *Agron. J.* 1961, 53, No. 3, 149-50, bibl. 9. [Iowa Agric. Exp. Sta., Ames]

The ratio of evapotranspiration/open-pan evaporation was determined during the growth of maize. The ratio increased approximately in proportion to the growth of the crop and reached a steady maximum when the maize was 50 in. tall. It is concluded that data from pan evaporimeters together with a factor for stage of development of the crop might be used to assess irrigation requirement.—R.H.F.

1670 GRAHAM, W. G. and KING, K. M. **Fraction of net radiation utilized in evapotranspiration from a corn crop.** *Proc. Soil Sci.*

Soc. Amer. 1961, **25**, No. 2, 158-60, bibl. 9. [Ontario Agric. Coll., Guelph, Canada]

The ratio of daily evapotranspiration to net radiation was determined at various stages in the development of a maize crop. Soil moisture in the plot was maintained at a level exceeding 75% available. There was good agreement between the daily evapotranspiration determined by a floating lysimeter and that computed hourly from the vertical heat budget method. The ratio of evapotranspiration to net radiation (E/R_n) averaged $0.81 \pm .09$ for the daytime period on days following rain when a large area was equally moist. Low values of E/R_n were associated with days of heavy cloud and high humidity. Values of E/R_n greater than unity during the daytime were obtained on some days when the maize plot was irrigated and the surroundings were dry. Freezing of the crop reduced E/R_n to 0.52. The stage of crop development prior to freezing did not have any effect on E/R_n under the soil-moisture conditions of this experiment. F. S.—R.H.F.

1671 ZONJIĆ, I. **Biological and economic characteristics of the home variety (populations) of white maize in Serbia. 3. Chemical composition of the grain.** [Serbian] *Zborn. Rad. Poljopr. Fakul.* 1959, **7**, No. 283, 1-26, bibl. 20-39, English summary. [Fac. Agric., Univ. Belgrade]

Thirty varieties of indigenous white flint and dent maize, 8 varieties of yellow flint and dent maize, and numerous strains isolated from the foregoing were studied in 1951-3 for the content of oil, protein, free sugar and vitamin A in the grain. The following average values were obtained: crude protein, white maize 13.6% in 1951 and 13.3% in 1953, yellow maize 13.4% in 1951 and 13.0% in 1953; oil content, white maize 4.9% in 1951 and 4.2% in 1953. Families selected from the same population differed from one another in oil content by 2%. The average oil content for 1951 and 1953, in yellow maize was 4.8% and in white 4.6%. Increased protein content was not found to be negatively correlated with oil content. Total free-sugar content in 1952 was white grain 4.97% and yellow 4.60%. Carotene content in a mixture of yellow-grain populations was 0.8 ppm. and in a mixture of white-grain populations 0.9 ppm. Cryptoxanthine content in mixed yellow-grain populations was 3.2 ppm. and in mixed white-grain populations 2.7 ppm. F. Eng. S.—G.M.R.

1672 HOLKOVÁ-SANTAMARÍA, L. and KUTÁČEK, M. **Sledování kvalitativních a kvantitativních změn obsahu rozpustných uhlohydrátů během vegetace čtyř odrůd kukuřice. [The qualitative and quantitative changes in the content of soluble carbohydrates of four maize varieties during the vegetative period.]** *Rostlinná*

výroba 1960, **6** (33), No. 11, 1547-66, bibl. 16, illus., Russian and German summaries.

The subject was studied in the aerial organs of Zajíček's Horse-tooth (mean growing period 140 days), Kočover Early (130 days), a hybrid of these 2 varieties (130 days), and Stupitz Early (100 days). Qualitative analysis showed the presence of ribose, fructose, saccharose, and perhaps raffinose and sorbose also. The number of different sugars found was lowest at the beginning and end of the growing period and highest at the beginning of flowering. Varietal differences were not recorded. Neither the individual organs, nor their parts, contained any sugars specific to them. There was some varietal difference in the sugar content of individual organs but this was less marked in the total sugar content. Chromatographic analysis showed glucose, fructose and saccharose to be the most abundant sugars. Changes in ribose content during the growing period reflected earliness in development. In all varieties the saccharose content exhibited 2 maxima separated by the time of maximum tillering. The content of reducing sugar rises slowly from the beginning of development and reaches its maximum at the time when saccharose content falls. The times at which maxima or minima were reached were approximately 14 days earlier in the earliest varieties than in the others. Sugar content was higher in the stems than in the leaves; the highest content was found in the stems and ears. F. Ger. S.—G.M.R.

1673 MUSÍKO, A. S. and others. **[Chemical composition of maize grain as affected by conditions of growth.]** [Russian] *Vestn. S.-H. Nauki (J. agric. Sci. USSR)* 1961, **6**, No. 3, 28-33, English, German and French summaries. [Lysenko Inst. Pl. Breed. and Genet.]

1674 SHAW, R. H. **Estimation of corn maturity in Iowa.** *Iowa State J. Sci.* 1961, **35**, No. 4, 457-62, bibl. 7.

Phenological data from 1926 to '57 for Iowa were used to investigate the correlation between the amount of maize maturing before being damaged by frost and various temperature/date parameters during the growing season. The average June temperature and the effective frost date were both significantly correlated with percentage of maize maturing. A regression equation based on these two parameters was developed ($r = +0.78$). A closer relationship was established ($r = +0.96$) using the date of 75% silking after 30 July and days from silking to the first frost.—R.H.F.

1675† LANDWIRTSCHAFTLICHES ZENTRALBLATT. Der Mais. Die wertvollste Futterpflanze. [Maize, the most valuable fodder crop.] Berlin: Inst. f. Dokumentation der Deutschen Akademie der Wissenschaften zu Berlin, 1961, n.d., pp. 48.

This is a classified collection of abstracts (in German) of papers (published 1956-9) from several countries.—D.B.

- 1676 MARTINEZ, A. and JAMES, C. N. Maiz. [Maize.] *Lista bibl. 3 Inst. Interamer. Cie. Agric. Turrialba, Costa Rica* 1960, Vol. 1 and 2, pp. 1145.

This bibliography of 10,734 publications which are available in the library of the above-mentioned institute covers all aspects of maize growing and production. The references are arranged under subject headings, and under each of these they are listed alphabetically by author. There is an author index. The preface, introduction and headings are in English and Spanish.—E.B.O.

SWEET-CORN

- 1677 EVANS, D. D. and others. Soil moisture, nitrogen, and stand density effects on growth and yield of sweet corn. *Tech. Bull. 53 Oregon agric. Exp. Sta.* 1960, pp. 36, bibl. 13, illus. [Oregon State Coll. Agric. Exp. Sta., Corvallis]

As a result of field experiments carried out over 3 seasons, 1954-5 and '7, with the sweet-corn variety Golden Cross Bantam it was concluded that a density of 15,000 plants/ac yielded slightly more ears and unhusked grain than one of 7500 plants/ac, and that optimum yield was obtained when 15-17 in. of water were used by the crop. Indications were that early irrigation, when the crop is about 1 ft high, would be beneficial.—R.H.F.

- 1678 HARRIS, E. D., Jr. DDT spray formulations and dosages for control of corn stem weevil, *Hyperodes humilis*, and fall armyworm, *Laphygma frugiperda*, on sweet corn. *J. econ. Ent.* 1961, 54, No. 3, 546-9, bibl. 5.

Sweet-corn was sprayed 5 times at 4-day intervals from emergence with toxaphene at 3 lb a.i./ac, DDT at 1, 2 and 3 lb a.i./ac as emulsifiable concentrates and DDT at 1, 2 and 3 lb a.i./ac as wettable powders. All treatments significantly reduced infestation by *H. humilis* and *L. frugiperda*.—R.H.F.

SORGHUMS AND OTHER MILLETS

See also Abs. 1843.

- 1679† QUINBY, J. R. and MARION, P. T. Production and feeding of forage sorghum in Texas. *Bull. 965 Texas agric. Exp. Sta.* 1960, pp. 16, illus, 1 map.

- 1680 STINSON, T. B. Tribune Branch Experiment Station report on corn, sorghums,

sudangrass, and safflower. *Bull. 425 Kansas agric. Exp. Sta.* 1961, pp. 14, 4 maps.

The average yield over a 5-yr period of Westland and Colby grain sorghums after summer fallow was 32.33, and after winter wheat, 12.47 bu/ac when sown on the optimum date of 5 June. Both varieties yielded about 10 bu/ac more at a 20-in. than at a 40-in. row spacing, when sown at 4 lb seed/ac after fallow; the difference was reduced to 5 bu/ac when the crops followed winter wheat.—R.H.F.

- 1681 LEPNEV, D. A. [Pre-sowing soaking of proso seed and covering the tillering nodes with soil.] [Russian] *Zemledelie (Agriculture, USSR)* 1961, 23, No. 5, 38-41, illus. [Kursk. Agric. Inst.]

With the object of increasing the number of flowering stems and seed-setting in *Panicum miliaceum*, the method (postulated by Gridasov) was tested. Seed was soaked in water for 48 hr and, subsequently, the tillering nodes of the sprouts were covered with soil. The first covering was effected (after seedling emergence) by heavy harrows and the second by cultivating the soil to a depth of 10-12 cm 7 days after the first covering. From the tests, which extended over 2 years, it is claimed that the method is satisfactory for improving grain yields, but only in warm and dry weather. There are problems still to be solved (by experiments in 1961) concerning use of fertilizers and soil cultivation.—M.H.

- 1682 GRIMES, D. W. and MUSICK, J. T. Effect of plant spacing, fertility, and irrigation managements on grain sorghum production. *Agron. J.* 1960, 52, No. 11, 647-50, bibl. 5. [Garden City Branch Exp. Sta., Kansas]

The results are reported of a series of experiments carried out from 1952-8 using the Westland variety of grain sorghum. The pooled regression of yield on row spacing obtained from a plant-population range giving highest yield was $Y = 117.11 - 0.72X$ where Y = yield of grain sorghum in bu/ac and X = row spacing in inches. A plant density of about 100,000/ac under optimum irrigation appeared to be the optimum, although a range of 56,000-224,000 had little effect on yield.—R.H.F.

- 1683 PAULI, A. W. and STICKLER, F. C. Effects of seed treatment and foliar spray applications of gibberellic acid on grain sorghum. *Agron. J.* 1961, 53, No. 3, 137-9, bibl. 7. [Kansas Agric. Exp. Sta., Manhattan]

Seeds of Midland, Westland, Plainsman and Redlan grain sorghum were germinated in the laboratory in solutions containing 0, 25, 50, 75 and 100 ppm. GA. The rate of germination of the last 3 varieties was increased by increasing amounts of

GA particularly during the 1st 24 hr. The final germination of all varieties was unaffected by GA. In another trial, seed of Midland was treated with a dust or slurry containing 4, 8 and 16 oz GA/100 lb seed. The rates of emergence were increased, particularly with the slurry treatment, but final stands were unaffected. Plants at the anthesis stage were sprayed with solutions containing 100 and 200 ppm. GA; there was no effect on plant height, maturation period, yield of grain or its components. In a third trial, a field stand of RS 610 grain sorghum was sprayed with 8 and 16 g GA in aqueous solution/ac, when 12 in. and 24 in. high, at flowering or at 10-day intervals from 12 in. (a total of 6 applications). In 1 yr out of 2, there was a significant response to GA; repeated applications increased yield of grain by 8 and 11% and plant height by 14 and 21% for the 2 levels, respectively, but no difference was shown in the components of yield in either year.—R.H.F.

1684† ARTETA, de la H. E. Algunos efectos de la aspersión foliar de ácido giberélico en sorgo (*Sorghum vulgare* Pers.). [Some effects of spraying sorghum (*S. vulgare*) leaves with gibberellic acid.] *Acta agron., Palmira* 1960, 10, No. 1, 1–15, bibl. 9, English summary. [Fac. Agron. del Valle, Palmira, Colombia]

In a plot trial, 1 or 2 spray applications of GA at 0, 50, 100, 200 and 500 ppm. were given to fodder sorghum var. Honey. Half the plots were dressed with 50 kg N/ha, while the other half received no N. No significant increases in the height and dry weight of the plants were obtained from GA treatment. The most important effect obtained was an increase in the protein content of the plants. This increase was 106% with 2 applications of GA at 500 ppm. in the plots that received no N, compared with the untreated controls. The increase in protein content due to the application of N was considerably lower than that due to GA treatment.—E.B.O.

1685 STICKLER, F. C. and PAULI, A. W. Leaf removal in grain sorghum. 1. Effects of certain defoliation treatments on yield and components of yield. *Agron. J.* 1961, 53, No. 2, 99–102, bibl. 10. [Kansas Agric. Exp. Sta., Manhattan]

In 3 experiments in 1958–9 sorghum plants were subjected to various patterns of leaf removal. The reduction in grain yield was not proportional to the reduction in leaf area. Defoliation caused delay in development, but more grain per unit of leaf area was produced by the remaining foliage. Reduction of yield was reflected in the number of heads, seeds per head, and seed weight; of these the effect on seeds per head was greatest. Removal of the upper leaves of the plant was more critical to yield than removal of the lower ones,

because their net photosynthetic rate was higher. There was no significant difference in yield from defoliation at the boot stage or at anthesis. These findings have a bearing on hail damage insurance.—J.D.J.

1686 ALBEY, D. D. and PENDLETON, J. W. Pre-harvest drying of grain sorghum. *Agron. J.* 1960, 52, No. 11, 669. [Univ. Illinois, Urbana]

The treatments of hand defoliation, severing the stem at the base and spraying with desiccants (MgClO_3 or dinitro-o-sec-butylphenol) were applied to the grain variety DeKalb D-50 on 3 occasions prior to harvest. The desiccants reduced grain moisture rapidly when it was above 18% but more slowly when below that figure. Defoliation was ineffective and severing the most effective in reducing grain moisture. All treatments, particularly when applied early, resulted in considerable loss in yield. In a date-of-sowing experiment the varieties RS501 and RS610 when sown early, 9 May, had grain moisture below 13% by 8 Oct. It was concluded that the cultural practice of early sowing was the best approach to the problem of sorghum-grain drying in the humid Corn Belt.—R.H.F.

1687 WALTER, T. L. and others. Kansas grain sorghum performance tests 1960. *Bull. 435 Kans. agric. Exp. Sta.* 1961, pp. 31, illus.

The highest yield reported, of 85 hybrids entered in 22 trials, was 170.3 bu/ac (1 yr's results) under irrigation in Finney county.—R.H.F.

1688 KILLINGER, G. B. and others. Evaluation of introduced plant species and varieties. *Rep. Fla agric. Exp. Sta. 1959* [n.d.], 59–60, illus. [Gainesville, Florida]

In varietal trials with grain sorghum, DeKalb DSOA (52.3 bu/ac) and Amak R12 (45 bu/ac) gave the highest yields. The sorghum varieties Early Hegari, Sagrain, Texas 601 and Texas 610 were sown on 6 dates from 7 April to 15 July 1958. Grain yields were highest for the first sowing date and declined when sowing was delayed. The development of Early Hegari was the most seriously affected by delay in sowing; at the earliest sowing date it was the first variety to come into ear, whereas at the later sowing dates it was the last. Among varieties of sesame [*Sesamum indicum*], a local variety yielded most seed, closely followed by Margo and Blanco.—R.B.

1689 MISSISSIPPI AGRICULTURAL EXPERIMENT STATION. Chemical weed control. *Rep. Miss. agric. Exp. Sta. 1958-9* [n.d.], 72, 39–40, 62.

Simazin at 2 lb/ac, diuron at 0.5 lb/ac and DNBP at 6 lb/ac used as pre-emergence herbicides in grain sorghum gave excellent weed control at

low cost and high grain yield. There were no significant differences between varieties in plant response, weed control or yield in 8 varieties of grain sorghum treated with a pre-emergence application of 2 lb simazin/ac. Monsanto's CP-6936 gave promising results in preliminary trials for pre-emergence weed control in milo [*Sorghum vulgare*.]—A.M.H.

1690 GOODE, J. P. and RANDOLPH, N. M. **Biology and control of the sugarcane rootstock weevil on grain sorghum in Texas.** *J. Econ. Ent.* 1961, **54**, No. 2, 301-3, bibl. 5. [Texas Agric. Exp. Sta., College Station]

In a series of experiments in 1960 on the control of the sugar-cane rootstock weevil *Anacrinus deplanatus* on grain sorghum the most effective control was obtained from granulated dieldrin or heptachlor applied at 1 lb/ac to the soil surface before sowing.—R.H.F.

1691 MISSISSIPPI AGRICULTURAL EXPERIMENT STATION. [Sorghum.] *Rep. Miss. agric. Exp. Sta.* 1958-9 [n.d.], **72**, 24-5, 53, 70.

The major pests of sorghum heads studied were sorghum midge, webworm and earworm. Single applications of DDT to heads in various stages of blooming gave good protection, but the best control of midge [*Contarinia* sp.] was from pre-bloom treatment. A de-fruitlet experiment showed that there was little or no loss of seed weight yield until 10-25% of the head was removed. This was due to increases in individual seed weight. In tests at the Coastal Plain Branch Station, on an 8-yr average, Tracy sorghum produced more syrup per ac than Sart, but on a 3-yr average, Wiley and Honey both exceeded Tracy in syrup production. At the North Mississippi Branch Station, Honey, Mer. 55-14 and Wiley gave the highest yields of stalk and syrup per ac.—A.M.H.

1692 STICKLER, F. C. and others. **Leaf area determination in grain sorghum.** *Agron. J.* 1961, **53**, No. 3, 187-8, bibl. 9. [Kansas Agric. Exp. Sta., Manhattan]

In a study of the leaves from 5 varieties, the product maximum length $\times$ maximum width $\times$ 0.747 was found to be highly correlated ($r = +0.994$) with the area obtained by the planimetric measurement of a leaf.—R.H.F.

1693† NIQUEUX, M. Une méthode d'estimation de la surface foliaire pour le sorgho (*Sorghum vulgare* Pers.). [A method for estimating the leaf area of sorghum.] *Agron. trop., Paris* 1961, **16**, No. 1, 99-102, bibl. 5, English and Spanish summaries. [Sta. d'Étude des Sorghos, Deli, Republic of Chad]

A method was studied for measuring the leaf area of sorghum in the field. For varieties of *Sorghum caudatum*, *S. elegans* and *S. guineense*, a good

estimate is obtained by using the formula: $S = 0.39 L (M + m)$, in which S is the leaf area in cm^2 , L the length of the blade in cm, M the maximum width in cm and m the minimum width of the proximal half of the blade in cm. F. s.—E.B.O.

1694 GAYTE-SORBIER, A. and others. Contribution à l'étude chimique d'*Eleusine coracana* Gaertner. [A contribution to the chemical study of *E. coracana*.] *J. Agric. trop. et Bot. appl.* 1960, **7**, No. 6-8, 383-6, bibl. 5, map.

Information is given on *E. coracana*, mainly its area of cultivation and the chemical composition of its grain.—E.B.O.

1695 KERSTING, J. F. and others. **Grain sorghum caryopsis development: 2. Changes in chemical composition.** *Agron. J.* 1961, **53**, No. 2, 74-7, bibl. 10. [Kansas Agric. Exp. Sta., Manhattan]

Percentages and amounts of N, total sugars, starch, and acid-hydrolyzable carbohydrates in sorghum caryopses were determined at 3-day intervals from pollination in 1958 and 1959, and diastatic activity was determined in 1959. N declined from 3 to 2% in the first 12 days and then remained constant. Sugars declined from about 10 to 2% in the first 18 days and then fell slowly to 1%. Starch increased rapidly from low figures to maxima of 79 and 64% in 1958 and 1959, respectively. Absolute amounts of these substances attained maxima at the dates of greatest dry weight, which were 44 and 33 days after pollination in the 2 years, respectively. Subsequent decreases were attributed to respiration. Acid-hydrolyzable carbohydrates followed the same pattern as starch. Diastatic activity and percentage germination were highly correlated.—J.D.J.

RICE

See also *Abs.* 1917, 1961.

1696 DASANANDA, S. **Rice in Thailand.** *Internat. Rice Comm. News Lett.* 1960, **9**, No. 4, 23-9. [Minist. Agric., Bangkok, Thailand]

1697 ANGLADETTE, A. Caractéristiques générales de la riziculture aquatique dans les pays de l'Océan Indien. [General characteristics of rice cultivation in water in the countries bordering the Indian Ocean.] *Mém. Inst. sci. Madagascar* 1959, **9**, 41-62, bibl. 14. [Seen March, 1961]

1698 MAGNE, C. **The cultivation of upland rice in rotation with groundnut in Senegal.** *Internat. Rice Comm. News Lett.* 1960, **9**, No. 4, 30-3. [Exp. Sta. Ziguinchor, Senegal]

In Casamance, Senegal, upland rice is grown by the Compagnie Générale des Oléagineux Tropicaux in the 4-year rotation : sorghum for green manure/groundnuts/rice/groundnuts. While the sowing, weeding and harvesting of groundnuts are done by traditional methods, the ploughing and all cultural operations with rice and green manure are mechanized. The rice varieties grown are 560 A (115 days) from Madagascar and R 67 (105 days) from Yangambi, Congo. Rice yields average 1200 kg paddy per ha. So far rice has not been a profitable crop, but its inclusion in the above rotation has allowed continuous cropping without soil depletion and has brought high returns from groundnut cultivation.—E.B.O.

1699 DEPARTMENT OF AGRICULTURE, ZANZIBAR.

Treatment of rice land between successive crops. *Suppl. Rep. Dep. Agric., Zanzibar 1959* 1960, 3-4.

At Kinuni Moshi (a wet area) and Nguruweni (a dry area) the following 6 off-season treatments were applied, in a replicated experiment, to rice land each year from 1955 to '9 : sweet-potatoes on ridges [un-manured], sweet-potatoes on ridges with f.y.m. at 10 tons/ac, groundnuts on ridges, gram [*Phaseolus*] on the flat, clean cultivation, no treatment. The average of 5 years' results showed that the best rice yield followed manured sweet-potatoes at Kinuni Moshi and a gram crop at Nguruweni. The highest gross financial return per yr was given by manured sweet-potatoes at both sites although at Nguruweni, this treatment gave lowest rice yields.—R.H.F.

1700 ESCURO, P. B. **The response of rice varieties to season of planting.** *Philipp. Agriculturist* 1960, 44, No. 1, 1-10, bibl. 15. [Central Exp. Sta., College, Laguna]

In a time-of-planting study, 10-day-old seedlings of 251 varieties were planted in irrigated plots every 2 months from the end of March to the beginning of Dec. 1955. For each of the 5 planting dates plant height was correlated positively and significantly with days to heading. There was also a high correlation ($r = 0.970$) between days to heading for the March planting and the range in these values obtained during the whole experiment, a high value indicating a markedly seasonal variety.—R.H.F.

1701 RJABČUN, O. P. **Effect of the water regime on the root system and basal nodes of rice plants.** [Russian] *Vestn. S-H. Nauki (J. agric. Sci. USSR)* 1961, 6, No. 3, 40-4, English, German and French summaries.

1702 KAUL, S. N. and ROA, V. M. **Deep-water-paddy cultivation in multi-purpose reservoirs.** *J. Soil Wat. Conserv. India* 1960, 8,

Nos. 2 and 3, 47-57, bibl. 1. [Emerging-land-utilization Research Station, Tilaiya Reservoir, Damodar Valley]

A cropping pattern was devised for land which is subject to rise and fall of water level in the 4 major reservoirs of the Damodar Valley Corporation. The rise in water level is dependent on the monsoon but the fall in level is controlled. A variety of crops can be grown depending on the season (whether one of rising or receding water level) and on the contour in the reservoir. This paper is limited to the cultivation of deep-water paddy which is suitable for the season of rising water level. The best varieties were Jaisuria and Tundia. These have a rapid growth rate which keeps pace with the rising water level which, for these varieties, may rise to 15 ft and 12 ft, respectively. The optimum sowing period was 15 May to 15 June, according to position with reference to water level in reservoir and time of rainfall, and the best sowing method was broadcasting. The crop is ready for harvesting (by boat if necessary) in Nov.-Dec. Yields vary between 1230 and 2970 lb [per acre]. Timely sowing to permit tillering before submergence improves yield. A too rapid rise in water level, and wave action which causes nodes to snap, affect yields adversely. A border of *Sesbania culeata* (which is grown for seed, green manure and fodder) acts as a break and protects the rice crop against wave action.—D.B.

1703 DEPARTMENT OF AGRICULTURE, FEDERATION OF MALAYA. **[Effect of water and soil temperature on growth in rice.]** *Rep. Dep. Agric. Malaya 1959* 1961, 32-3. [Bukit Merah Padi Exp. Sta.]

It was found that the temperatures of the water and the soil in rain-fed wet paddy fields rose above the optimum for rice growth particularly during the vegetative period. These temperatures were lowered [no details given] up to the time of heading by applying carbon black powder to the water surface at the rate of 20g/m² 3 times at 3-weekly intervals from transplanting. The following effects were noted : (a) a darker rice-leaf colour from 1 week after application of the powder until ripening, (b) a delay of 2 days in heading, (c) a restriction of weed growth and (d) an increase in yield [no data given].—R.H.F.

1704 DŽULAI, A. P. **Effect of fertilizers on the growing period and yields of the rice crop.** [Russian] *Vestn. S-H. Nauki (J. agric. Sci. USSR)* 1961, 6, No. 6, 20-2, English, German and French summaries.

1705 BEACHELL, H. M. and others. **Belle Patna.** *Rice J.* 1961, 64, No. 6, 6, 8, 24-6.

This is a description, with comparative data, of the agronomic performance of Belle Patna, a

new variety of very early-maturing long-grain rice developed at the Rice-Pasture Exp. Sta., Texas.
—R.H.F.

1706 CAFFEY, H. R. **Rice varieties for State growers.** *Miss. Fm Res.* 1961, **24**, No. 4, 4. [Delta Branch Exp. Sta., Stoneville, Mississippi]

The yields and agronomic characteristics of 23 varieties included in tests in 1960 are given. Century Patna, an early-maturing long-grain variety which occupied 17% of the state acreage in 1960, gave the highest yield at 6592 lb [unmilled] rice/ac.—R.H.F.

1707 ORMROD, D. P. and BUNTER, W. A. **The evaluation of rice varieties for cold water tolerance.** *Agron. J.* 1961, **53**, No. 2, 133-4. [Univ. California, Davis]

The test was conducted in a sunlit cold chamber in water at 60° [F] and was judged by leaf length and percentage survival after 28-30 days. No US variety was better in growth or survival than the control variety, Caloro. Six of the 19 tested were as good as Caloro for growth, and all but 4 for survival. Californian varieties were more tolerant than those from the southern States, and short-grain varieties more tolerant than long-grain. None of 36 varieties from the World Collection was better than Caloro in growth or survival, and many Japanese varieties from comparable high latitudes were inferior. Two varieties from Taiwan, one each from China and Korea, and 2 from Portugal were promising. Field trials to test the reaction of older plants are in progress.—J.D.J.

1708 PORTÈRES, R. Riz subspontanés and riz sauvages en El Salvador (Amérique Centrale). [Semiwild rice and wild rice in El Salvador (Central America).] *J. Agric. trop. et Bot. appl.* 1960, **7**, No. 9-10, 441-6, bibl. 14.

This article is concerned with *Oryza glaberrima* and *O. latifolia* in El Salvador. *O. glaberrima*, known locally as red rice, is a weed of cultivated rice (*O. sativa*). *O. latifolia* is a species of wild rice but is not a weed of rice-fields.—E.B.O.

1709 POONAI, P. **Why and how to control Jharanga or "dropseed" in rice fields.** *Rice Rev.* 1960, **2**, 13-15, illus.

Jharanga (shattering rice) varieties usually have a red testa, mature early and shatter in the field before the rice harvest. The basic recommendation for their control, as made to small farmers, is to carry out thorough wet puddling of the soil in banded fields prior to broadcasting pregerminated crop rice. The coating of mud thereby given to the dormant seed delays or prevents its germination but has no deleterious effect on the germinated seed. [See also Abs. 1167].—R.H.F.

1710 HUDGINS, H. R. **Chemical control of barnyard grass in the Texas rice belt.** *Rice J.* 1961, **64**, No. 4, 14-15 and 34-35, bibl. 4. [Rice-Pasture Exp. Sta., Beaumont, Texas]

Results are reported of a trial with Gulfrose and other rice varieties, and the herbicides zytron and stam F-34 (3, 4-dichloropropionanilide) for the control of *Echinochloa crus-galli*. Zytron gave control only when applied at 10, 20 or 30 lb formulation/ac before emergence of weeds in dry-sown rice-fields. The best control was obtained from stam F-34 applied at 3 lb formulation/ac in 5-20 gal water to dry-sown rice when it was at the 4-leaf stage and the weed at the 1 to 3-leaf stage, followed by flooding to 3 in. Rice treated at a later stage suffered leaf injury but recovered fully within 10 days.—R.H.F.

1711 PETRASOVITS, I. and SZILVÁSSY, L. Vegyszeres gyomirtási kísérletek a rizsben. [Experiments on chemical weed control in rice.] *Növénytermelés* 1960, **9**, No. 4, 289-98, bibl. 7, illus., English summary. [Res. Inst. Irrig. Rice Breed., Szarvas, Hungary]

Promising results were obtained in rice with the 2,4-D preparation dikonirt and the MCPA preparation nikrezil paste. Doses of 1.5-3 kg/ac successfully controlled *Alisma* spp. (within 10 to 14 days under favourable conditions), *Schoenoplectus mucronatus*, *Butomus umbellatus*, and *Eleocharis palustris*. The optimum time of spraying is the period between the end of tillering and the beginning of shooting. In the 2- to 4-leaf stage every rice variety, and especially Dubovszky 129, is highly susceptible to herbicides of the hormone type, and spraying at this stage produces severe morphological abnormalities. F. Eng. s.—G.M.R.

1712 BOWLING, C. C. **A comparison of the effectiveness of aldrin seed treatment for rice water weevil control on water- and drill-seeded rice.** *J. econ. Ent.* **53**, No. 6, 1135-7, bibl. 2. [Rice-Pasture Exp. Sta., Beaumont, Texas]

Seed treatment, at the rate of 4 or 8 oz 50% aldrin/100 lb seed, was equally effective in reducing attack by *Lissorhoptrus oryzophilus* and significantly increasing yield of rice, whether the rice was sown direct into standing water or drilled into dry soil.—R.H.F.

1713 YAMADA, N. **Physiological basis of resistance of rice plant against overhead flooding.** [Japanese] *Bull. nat. Inst. agric. Sci., Nishigahara, Ser. D* 1959, No. 8, pp. 110, bibl. 149, illus., English summary.

When rice plants were submerged under flood water the oxygen content in them was greatly decreased owing to an insufficient supply of oxygen to the plants. Under this decreased supply aerobic respiration was reduced, and its rate was

proportional to the oxygen tension; on the other hand, anaerobic respiration was promoted and resulted in an increase in the consumption of respiratory substrates and a decrease in the generation of energy. Accordingly, the available carbohydrates in the plants were exhausted rapidly, and soon the shortage of these compounds limited the rate of respiration. Resistance to flooding is determined by the following factors: (a) the quantity of carbohydrates in the plant before flooding, (b) the rate of substrate consumption—which can be expressed by the respiratory rate, and (c) the extent of protein hydrolysis. The extent of protein hydrolysis depends on the oxygen tension. Low oxygen tension tends to inhibit protein hydrolysis, and the plants die without changing leaf colour. A higher oxygen tension caused by the supply of fresh water to the submerged plants results in lower consumption of the substrates and makes the substrate which is derived from protein last a long time; the plants die finally after changing their colour to yellowish brown.—T.T.

1714 EHRLER, W. Some effects of salinity on rice. *Bot. Gaz.* 1960, **122**, No. 2, 102-4, bibl. 8. [U.S. Salinity Lab., Riverside, California]

In glasshouse studies with Caloro rice in nutrient culture, NaCl, CaCl₂ and Na₂SO₄ were added in sufficient quantity to increase the osmotic pressure of the medium by 1 and 2 atmospheres. At 2 atm there was a large depression of plant growth, the grain being more affected than the straw or the roots. This reduction was thought to be due to the increased osmotic pressure and not to any specific ion.—R.H.F.

1715 NISHINO, T. Relationship between growth and transpiration in rice plants. [Japanese] *Proc. Crop Sci. Soc. Japan* 1961, **29**, No. 2, 210-12, bibl. 5, illus., English summary. [Shikoku Agric. Exp. Sta.]

The author devised a new type of apparatus for measuring the amount of transpiration of crop plants under cultural conditions. By means of this apparatus, the seasonal changes in transpiration of rice plants under early, normal, and late-season cultural conditions were measured. In order to eliminate the climatic effects on transpiration, the t/E values (t = amount of transpiration from the rice plant in mm, E = amount of evaporation from free water surface in mm) were used. In spite of the difference in the time of transpiration, the t/E values changed with the growth stages. When the plants are not very leafy, the t/E values are mainly determined by the magnitude of growth, and the effect of climate on them is subsidiary. When the plants are very leafy and the L.A.I. exceeds 4-5, then the t/E values are determined by climate and are little affected by growth. It was concluded that the amounts of transpiration in rice

plants could be estimated by measuring the magnitude of growth of the plant and the evaporation from free water surface.—T.T.

1716 ORMROD, D. P. Photosynthesis rates of young rice plants as affected by light intensity and temperature. *Agron. J.* 1961, **53**, No. 2, 93-5, bibl. 4. [Univ. California]

The net photosynthesis of rice seedlings 3.5-5 weeks old, in a controlled-environment chamber, was appreciable at 40° and generally highest at 60°F. At 80°F it was reduced by the higher respiration rate, and there were considerable net losses of carbohydrates when this temperature was associated with low light intensities, as would happen in the field during warm nights. Photosynthesis and respiration balanced at 150 f.c. and 40°F, at 400 f.c. and 60°F, and at 1400 f.c. and 80°F. It follows that the rate of net photosynthesis at low temperature, whether light intensity be low or high, is not responsible for the poor condition of rice seedlings which is observed in many years.—J.D.J.

1717 ZSOLDOS, F. A nitrogén hasznosításának vizsgálata rizs növényeknél. [Studies on N utilization by rice plants.] *Agrokémia és Talaj.* 1960, **9**, No. 4, 501-10, bibl. 28, illus., English summary. [Univ. Sci., Szeged, Hungary]

The effects of increasing concentrations of ammonium salts and the detoxification of the ammonia taken up was studied in rice plants grown in sand culture. It was found that seedling weight was reduced and the content of 8 amino acids increased by increasing the NH₄-N content of the nutrient. Between the booting and flowering stage alanine accounted for up to 50% of the amino acid exuded from the roots, and this is stated to indicate that the NH₄-N taken up is transported to the aerial parts of the plant mainly as alanine. F. Eng. s.—G.M.R.

1718 VEGA, M. R. and OBIEN, S. R. The response of some lowland rice varieties to 2,4-dichlorophenoxyacetic acid (2,4-D). *Philipp. Agriculturist* 1960, **44**, No. 1, 45-65, bibl. 6, illus.

1719 LINDNER, K. and others. Der Nährwert der in Ungarn angebauten Reissorten. [The nutritional value of Hungarian-grown rice varieties.] *Qual. Plant. et Materiae veg.* 1961, **8**, No. 1, 25-37, bibl. 12, map, French and English summaries. [Inst. Nutrition Sci., Budapest, Hungary]

The cooking quality of 40 varieties of rice grown in Hungary and the content and composition of the crude protein in their grain are given. F. Eng. s.—R.B.

1720 KESTER, E. B. Rice investigations at Western Regional Research Laboratory

[California]. *Internat. Rice Yearb.* 1960, 15-18, illus.

In 1957-8, samples of 57 varieties of rice were taken as the grain increased in maturity giving a range of grain moisture from 58 to 14%. The grain moisture at harvest associated with maximum yield varied between varieties and between years and ranged from 21.6-31% for Caloro and Calrose. Various physical and chemical tests were carried out on the milled samples and the following conclusions reached: (1) total N in the first and final samples was the same; (2) the amino N, crude fat, crude fibre and ash was reduced as grain moisture decreased; (3) the viscosity of ground grain paste in Caloro and Calrose remained the same in 1957 but in 1958 (when a wider range of grain moisture was covered) viscosity increased as moisture decreased; (4) acidity in terms of milli-equivalents of short-chain non-amino plant acids, when determined on the 1957 series of Calrose samples, showed a rapid reduction from the initial sample (33.3% harvest moisture) until the moisture content was about 27%, then remained fairly constant. In a further study the water-soluble non-amino acid extractable from white rice milled from Caloro stored at 4 moisture contents and at 60, 77, 90 and 100°F increased with (a) increasing storage temperature and (b) increasing moisture at the 3 higher temperatures.—R.H.F.

1721 CHARAVANAPAVAN, C. A note on storage tests on paddy. *Trop. Agriculturist* 1960, 116, No. 1, 27-9. [Batalagoda, Maha Illuppallama and Polonnaruwa Res. Sta., Ceylon]

A moisture content above 12% is detrimental to the keeping quality of paddy. In an investigation with 8 rice varieties, the average moisture content after harvesting and threshing was 16%, after sun-drying for 3-4 days it was 7.3%, and increased to 10% and 9.1% during 9-months storage in sacks and bins, respectively. Paddy stored at a moisture level below 12% in glass jars developed no rancidity after 1 yr.—E.B.O.

1722 PASFIELD, D. H. Report to the Government of the Union of Burma on the design and construction of storage and handling facilities for rice and rice products. *Rep. 1007 FAO/ETAP* 1959, pp. 12. [Received Feb. 1961]

1723 POLDERMAN, H. A. Second report to the Government of the Sudan on rice production. *Rep. 1108 FAO/ETAP* 1959, pp. 23. [Received Feb. 1961]

1724 PAN, C. L. Report to the Government of the United Arab Republic (Egyptian

Province) on rice production. *Rep. 1067 FAO/ETAP* 1959, pp. 16. [Received Feb. 1961]

1725 CHAO, L.-F. Report to the Government of Iraq on rice production. *Rep. 1081 FAO/ETAP* 1959, pp. 25. [Received Feb. 1961]

GENERAL

1726 MILOŠEVIĆ, P. Studying the effect of the more important factors on grain loss at wheat harvest. [Serbian] *Žborn. Rad. Poljopr. Fakul.* 1959, 7, No. 273, 1-59, bibl. 62, illus., English summary.

From 1950 to 1957 studies were made of the amount of grain lost in harvesting wheat, barley and oats (a) by ordinary reaper followed by stooking sheaves, loading into carts and on to the thresher etc., and (b) by combine harvester. Factors taken into account were the degree of ripeness (self-shedding increases markedly when the crop is over-ripe), rainfall, temperature and relative air humidity, the height of cut (by raising this the rate of grain loss increases considerably), the speed of binder or combine (there is intense shedding of grain when speed is excessive, especially with an over-ripe crop), and time of day (e.g. sheaf-carrying should be avoided between 10 a.m. and 4 p.m., when there is a fall in air relative humidity and grain loss increases). Investigations show that in Serbia a combine harvester may be used successfully, but the total loss under normal conditions usually exceeds that from the use of a binder. F. Eng. s.—G.M.R.

1727 ELIASSON, S. and AGERBERG, L. S. Sortförsök med vårsträsad på organogena jordar i södra och mellersta Sverige. Variety trials with spring-sown cereals on organic soils in southern and central Sweden. *Medd. Stat. JordbrFörsök, Uppsala* 1960, No. 115, 1-48, bibl. 21, English summary.

The results of trials conducted from 1941 to 1959 with spring wheat (14 varieties in 130 trials), barley (16 varieties in 260 trials) and oats (16 varieties in 458 trials) are summarized, and information is given on total grain yield, grain content, yield of grain free from husks, hectolitre weight, 1000-grain weight, earliness, and strength of straw. F. Eng. s.—G.M.R.

1728 MÜLLER, K.-H. Ergebnisse mehrjähriger Wintergetreide-Sortenversuche. [Results of several years' trials with winter-cereal varieties.] *Landw. Vers- u. UntersuchWes.* 1960, 6, No. 4, 322-52, maps, English and Russian summaries.

The following conclusions were drawn from extensive trials in E. Germany between 1951 and

'58. For conditions prevalent there the late varieties of winter barley Rekord and Jutta yielded best; the early varieties Askania and Mahndorfer have a special importance on the fringe of winter-barley areas. Petkuser was the highest-yielding winter-rye variety. Under an optimal environment for wheat Hadmerslebener VIII yielded best; under less favourable conditions Bastard II and Hochland gave good yields. F. Ger. s.—D.B.

1729† PASCALE, A. J. and DAMARIO, E. A. Características bioclimáticas de las avenas, cebadas y centenos cultivados en la República Argentina. [Bioclimatic characteristics of oat, barley and rye varieties grown in Argentina.] *Rev. Fac. Agron., La Plata* 1960, **36**, No. 1, 9–31, bibl. 8, English summary. [Observ. Agrometeor. Castelar, Argentina]

In a trial in 1952–4, vernalized seeds of 7 varieties of oats, 7 of barley and 4 of rye were sown at approximately 20-day intervals from early April to late Oct. The control seeds were not vernalized. Phenological observations, made during the whole growth cycle, were used for calculating Geslin's Heliothermic Index for the sub-period emergence to earing and the partial indices for the sub-periods emergence to stalk formation and stalk formation to earing. The examination of the last 2 sub-periods allowed a separate study of the potential of the varieties for forage production, or forage and grain production, respectively, while the examination of the emergence to earing sub-period showed the general bioclimatic characteristics of the varieties.—E.B.O.

1730 GRZESIUK, S. and KULKA, K. Wolne aminokwasy dojrzewającego ziarna zbóż. Free amino-acids in ripening grain of cereals. *Roczn. Nauk rol.* 1960, **83**, Ser. A, No. 2, 243–76, bibl. 31, illus., Russian and English summaries.

The subject was studied in ripening grain of barley, oats, wheat and rye (winter and spring crops). Fifteen free amino acids were identified. Glutamic acid appeared in the largest quantities, then aspartic acid, arginine, asparagine, threonine and valine. The number and quantity of free amino acids decreased as the grain ripened, and a particularly rapid decrease in number was observed at the beginning of embryo development. Ripening grain threshed directly after harvest contained larger quantities of free amino acids than grain stored in ears. The largest number of amino acids was contained in oats, and the smallest in winter wheat. Varietal differences in quantity were noted. As a rule, ripening spring-sown grain contained larger quantities of amino acids than the winter forms. Rye grain harvested at the mid-wax ripeness stage showed maximum vitality and

the embryo contained a large quantity of amino-butyric acid. F. Eng. s.—G.M.R.

1731 CALDERON, M. and SHAYA, E. Estimations of carbon dioxide in stored grain: an indication of condition. *Trop. Sci.* 1961, **3**, No. 1, 25–30, bibl. 6.

The temperature of stored grain is widely used as a criterion of its condition during storage. By using a simple thermal conductivity gas analyzer, CO₂ concentration in stored grain can be used instead to indicate metabolic activity by insects or moulds.—G.L.S.

1732 MACHACEK, J. E. and others. Effects of a high water content in stored wheat, oat, and barley seed on its germinability, susceptibility to invasion by moulds, and response to chemical treatment. *Canad. J. Pl. Sci.* 1961, **41**, No. 2, 288–303, bibl. 41. [Canada Dep. Agric., Winnipeg, Manitoba]

The rate at which germinability is lost in untreated wheat, oats and barley grain was found to depend chiefly on its water content and on the temperature at which it is stored. Germinability of treated grain also depends on other factors, such as the chemical used for seed treatment and the kind of grain treated. The total reduction in germination was dependent on the duration of storage. Grain which had been wet, but was dried by the time of treatment, showed about the same degree of chemical injury as grain that had not been wet. Chemical treatment often impaired the germination of grain that was only moderately damp and did not prevent deterioration of grain that was very damp. Pre-storage treatment of smut-free grain is, therefore, not recommended. F. s.—R.B.

1733 BROEKHUIZEN, S. and VAN DEN HIL, J. Overzicht van het graanonderzoek in Nederland 1960. [Review of cereal research in the Netherlands 1960.] *Gestenc. Publ. Ned. Graan-Centrum, Wageningen* 1960, pp. 188, mimeo.

Research on cereal crops currently in progress in the Netherlands is reviewed under the heads: seed investigations; metabolism; developmental physiology; anatomy, morphology and taxonomy; phenology and field botany; heredity; plant breeding; varietal research; diseases; cultivation; manuring; harvesting; drying and storage; crop quality; economics and statistics. Tabular data are given on the problems involved, the crops under investigation, the urgency of each problem, the amount of research work already completed, the organizations and individuals carrying out the work, and the names of institutes in other countries investigating similar problems. Projects on which little or no

research has been carried out are listed according to their nature and urgency.—R.B.

LEGUMES

SOYABEANS

See also *Abs.* 1850.

1734 SMITH, T. J. and others. **Soybean performance in Virginia as affected by variety and planting date.** *Bull.* 526 *Va agric. Exp. Sta.* 1961, pp. 30, illus.

The soyabean varieties Clark, Perry, S-100, Dorman, Hood and Lee (in increasing order of lateness of maturity) were sown at fortnightly intervals from 5 May to 5 July at 4 sites for 4 seasons, 1956-9. Maximum yields were obtained from sowing on 20 May or 5 June and from the 2 latest-maturing varieties.—R.H.F.

1735 ABEL, G. H., Jr. **Response of soybeans to dates of planting in the Imperial Valley of California.** *Agron. J.* 1961, 53, No. 2, 95-8, bibl. 8. [Crops Research Div., U.S.D.A.]

When 5 varieties of soyabean of varying maturation periods were sown at fortnightly intervals from 2 May to 2 Aug., delay in sowing was largely offset by contraction of the period to maturity. This contraction occurred after flowering in the earliest, and before flowering in the latest maturing variety. The highest yields of seed were obtained from intermediate and medium-late varieties sown in May and June. Delayed sowing reduced plant height in tall varieties especially, but there was less lodging as a result. Seed quality improved with delayed sowing, but seed size diminished in the last 3 sowings particularly in the earlier varieties.—J.D.J.

1736 HARTWIG, E. E. **Soybeans: variety, row width studies.** *Miss. Fm Res.* 24, No. 3, 3. [Mississippi Agric. Exp. Sta., Stoneville]

Six soyabean varieties were evaluated on a clay and a sandy loam in 1960. The variety Hood outyielded Lee, which had been superior over the previous 7 years, on both soil types. The order of preference for the Delta area is Lee, Hill, Jackson, Hood, Bienville and Dorman. In another trial in 1960, the varieties Hill and Lee showed no difference in yield when sown at 40-in. [local practice] or at 27-in. row-spacings, with the same 12-in. intra-row distance. It was concluded that yields in the Delta area were not limited by wide spacing.—R.H.F.

1737 GERLOW, A. R. and MULLINS, T. **Economics of supplementary irrigation of soybeans.** *Bull.* 634 *Arkansas agric. Exp. Sta.* 1960, pp. 34.

Rice acreages have had to be reduced because of surpluses, and in 1959 soyabeans accounted for 40% of the income of rice farms. A survey was made of 36 farms in the Grand Prairie area and 27 farms in N.E. Arkansas. In the drier years 75% of the soyabeans were irrigated. Rainfall records for 67 yr indicated that irrigation would be necessary in Aug. or Sept. in 6 years out of 10. Irrigation increased soyabean yields by about 8 bu/ac in both areas. The total cost of pumping water from wells and building banks was about \$6/ac. Of necessity the return was greater in dry years, but averaging the charges over all years the return from irrigated soyabeans was \$39/ac and from non-irrigated \$31/ac. Soyabeans were less profitable than rice, and at 1959 prices their substitution for rice resulted in a loss of \$36/ac in the Grand Prairie area and \$27/ac in the north-east area.—J.D.J.

1738 JOHNSON, H. W. **Registration of soybean varieties.** 7. *Agron. J.* 1960, 52, No. 11, 659-70, bibl. 21. [USDA, Beltsville, Md]

The following varieties are described: Acme, Bienville, Comet, Ford, Hill, Hood, Lindarin, Merit and Shelby.—R.H.F.

1739 HAY, J. R. **Pre-emergence weed control in soybeans with mixtures of two herbicides.** *Weeds* 1961, 9, No. 1, 117-23, bibl. 9. [Canada Dept Agric., Ottawa, Ontario]

Experiments in 2 seasons showed that a mixture of CDAA (to control grasses) and dinoseb (to control broad-leaved weeds), each at 3-4 lb/ac, was more effective in soyabeans than either chlorpropham, NPA, CDAA or dinoseb alone. There were 2 grasses and 7 broad-leaved species in the weed flora. CDAA distorted the plumular leaves of some soyabean varieties, but the injury was not permanent. The mixed herbicides were best applied just before emergence or at sowing time. Soyabeans at Ottawa in 1958 and 1959 gave the same yields in rows 7, 24 and 36 in. apart, and the best weed control was obtained from band applications of herbicides over rows 36 in. apart.—J.D.J.

1740† ZIMMERMAN, R. P. and KARDOS, L. T. **Effect of bulk density on root growth.** *Soil Sci.* 1961, 91, No. 4, 280-8, bibl. 18, illus. [Pennsylvania Agric. Exp. Sta., University Park]

Sudan grass [*Sorghum sudanense*] seedlings and soyabean plants were grown in contact with blocks of 4 soils which had been compacted to give a bulk density ranging from 1.4 to 2.0. Sudan grass roots were able to penetrate compacted (high bulk density) soil better than those of soyabean. Root penetration of both species was negligible at bulk densities of 1.8-2.0, depending on the soil type. F. S.—R.H.F.

1741 MIKSCH, J. P. **Developmental vegetative morphology of *Glycine max*.** *Agron. J.* 1961, 53, No. 2, 121-8, bibl. 11, illus. [Iowa Agric. Exp. Sta., Ames]

The developmental anatomy of the soybean is traced, from the organization of the dormant seed through germination and subsequent growth to floral initiation. The relevance of certain features to practical issues is discussed and suggestions are made for further study.—J.D.J.

1742 BROWN, D. M. and OWEN, C. W. **Effect of photoperiod on soybean development.** *Soybean Dig.* 1961, 21, No. 7, 14-16, bibl. 3. [Harrow, Ontario]

The soybean variety Mandarin was sown on 15 May and at 3 fortnightly intervals thereafter. The time from emergence to flowering decreased from 35 to 28 days between the 1st and 4th sowing, whilst time from flowering to maturity was constant at about 66 days. These differences in the two phases of development are ascribed to (a) the additive effect of increasing night length and average temperature in the first, and (b) the compensatory effect of decreasing average temperature and continued increasing night length in the second phase of development.—R.H.F.

1743 JOHNSON, H. W. and others. **Effects of photoperiod and time of planting on rates of development of the soybean in various stages of the life cycle.** *Bot. Gaz.* 1960, 122, No. 2, 77-95, bibl. 12. [Maryland Agric. Exp. Sta., Beltsville]

Four separate experiments were carried out from 1955 to '58 under glasshouse conditions. Six soybean varieties of varying maturation period were used in each experiment, Lee, Dorman and S100 being common to all experiments. The treatments applied were: (1) constant photoperiod of 14.5, 14, 13.5 and 13 hr during the whole growing period and 3 sowing dates; (2) photoperiod changing as in nature at 4 latitudes (15-75 min longer than 14.5 hr) and 4 sowing dates; (3) photoperiods as in (1) applied after an initial 16 days of long day from emergence + an inductive photoperiod of 10 hr lasting for 0 or 7 days or until beginning of flowering; (4) photoperiods as in (1) applied to plants that had been under a constant 13-hr photoperiod, at (a) beginning of flowering, (b) pod-set, (c) end of flowering. The results (means of 3 common varieties) showed that, for sowings on similar dates, the time from emergence to flowering was 14 days longer, from flowering to pod-set was the same, and from pod-set to maturity was 4 days earlier under photoperiod regime (2) as compared with (1). The effect of time of sowing on the development phases was small in (1), but in (2) there was the following uniform reduction with each 2-wk delay in sowing:

emergence to maturity, -6 days; emergence to flowering, 4 days; beginning to end of flowering, 3 days; flowering to pod-set, 2 days; but pod-set to maturity was unaffected. Varietal differences in time from emergence to maturity were expressed after flowering in (1) but before flowering in (2). Interactions between photoperiod and sowing dates were significant in (2) but not in (1). Interactions between photoperiod and variety and between variety and sowing date, for most characteristics measured were significant in (1) and (2). In (3) there was no difference between 0- or 7-day induction at 10 hr photoperiod followed by a 13 hr photoperiod, but the early varieties flowered at the same time, about 40 days, and later varieties flowered up to 16 days later with the longer post-inductive photoperiods. In (4) the developmental phases, except flowering to pod-set which was unaffected, were delayed the longer the imposed photoperiod, and these effects were greater the earlier they were begun. Dissections showed that all plants had formed flower primordia by 35 days.—R.H.F.

1744 NAGATA, T. **Studies on the differentiation of soybeans in Japan and the world.** *Mem. Hyogo Univ. Agric.* 1960, 3, No. 2, 63-102, bibl. 101.

This paper deals with the classification of soybean (*Glycine max*) according to seasonal habit (summer and autumn types) and morphological characteristics. Accounts are also given of the geographical distribution of the various types of *G. max* in Japan and in the rest of the world.—D.B.

GROUNDNUTS

See also *Abs.* 1843.

1745 SMARTT, J. **A guide to groundnut cultivation in Northern Rhodesia.** *Rhod. agric. J.* 1961, 58, No. 2, 94-102, bibl. 5.

1746 HARRIS, H. C. and others. **Nutrition and physiology of the peanut.** *Rep. Fla agric. Exp. Stas* 1960 [n.d.], 49-50. [Florida Agric. Exp. Sta., Gainesville]

In a field experiment with Early Runner and Virginia Runner groundnuts, in which row spacings of 38 and 12.67 in. were used, the highest yield, 4759 lb/ac, was obtained from Early Runner planted in rows 12.67 in. apart [intra-row spacing not stated] fertilized with 2500 lb/ac of 4:12:12 NPK mixture ploughed in with a preceding cover crop of rye.—R.H.F.

1747 SMARTT, J. **Groundnut varieties of Northern Rhodesia and their classification.** *Emp. J. exp. Agric.* 1961, 29, No. 114,

153-8, bibl. 5. [Cent. Agric. Res. Sta., Mount Makulu, N. Rhodesia]

A collection of Northern Rhodesian groundnut varieties is described. It has been possible to classify most of the forms in accordance with Bunting's system. Additional groups have been added to include some new and previously undescribed forms. These groups extend the recorded range of homologous variation within and between the principal sections of the species, e.g., runners of the Matevere group and runners with a range of testa colours have been encountered. F. s. —E.B.O.

1748 BURT, E. O. and RODGERS, E. G. **The effects of simulated rainfall on the herbicidal activity of DNBP and sesone.** *Rep. Fla agric. Exp. Stas 1959* [n.d.], 62. [Gainesville, Florida]

Dinoseb, 2,4-DES and simazin were applied as pre-emergence herbicides at 2, 4 and 12 lb/ac to control annual weeds in groundnuts grown on Lakeland soil, a sandy loam, and Greenville soil, a sandy loam containing clay. 2 in. of simulated rainfall every 7 or 8 days caused more leaching of herbicides than 1 in. of rainfall, whether applied as 1 or as 2 or more applications. Herbicidal leaching, as indicated by plant abnormalities and reduced plant weight, was higher on Lakeland than on Greenville soil. Simazin was most toxic to groundnuts, and 2,4-DES caused slight damage; dinoseb had no effect. Where 0.5-2 in. of simulated rainfall was applied during the first 2 weeks after sowing, more damage occurred to groundnuts than where similar amounts of simulated rainfall were applied at later dates, but weed control was more efficient in the former instance. —R.B.

1749 BURT, E. O. **Herbicidal control of weeds in peanuts.** *Rep. Fla agric. Exp. Stas 1959* [n.d.], 64. [Gainesville, Florida]

Dinoseb applied at 9 and 12 lb a.i./ac before groundnut emergence gave very good control of grass and broad-leaved weeds without injury to the crop. CIPC [chlorpropham] at 6 and 9 lb/ac and CDAA at 12 lb/ac gave results nearly as good. Applications of 2,4-DES at 2, 4 and 6 lb/ac gave fair to good weed control with little or no crop damage. Post-emergence treatment with dinoseb at 3 lb a.i./ac, or with 3 lb dinoseb + 2 lb 2,4-DES/ac, gave almost complete control of all annual weeds but caused temporary stunting of the crop. —R.B.

1750 LIPSCOMB, R. W. **Herbicidal control of weeds in peanuts.** *Rep. Fla agric. Exp. Stas 1959* [n.d.], 339. [Marianna, Florida]

Of various herbicides tested, dinoseb at 9 lb/ac, and 2,4-DES at 2 or 4 lb/ac, applied

before groundnut emergence, gave the best control of annual weeds, and were most effective under conditions of frequent light rainfall. Applications of dinoseb at 3 lb/ac with or without 2,4-DES at 2 lb/ac one week after crop emergence gave complete control of annual weeds for 6 weeks, but caused slight, temporary leaf burn to the crop. —R.B.

1751 WILCOX, M. and RODGERS, E. G. **Herbicidal control of weeds in peanuts.** *Rep. Fla agric. Exp. Stas 1960* [n.d.], 58. [Florida Agric. Exp. Sta., Gainesville]

Good control of grassy and broad-leaved weeds in groundnuts was obtained by pre-emergence applications of dachal at 12 lb, DNBP (granular) at 6 lb, CDAA at 18 lb, amiben at 2 and 4 lb + DNBP (liquid) at 4 and 6 lb, and amiben at 3 + R-2061 at 8 lb/ac, with no damage to the crop. Amiben at 3 lb/ac controlled broad-leaved weeds only. —R.H.F.

1752 MEYER, J. and WERGIFOSSE, A. de. **Microbiologie du gynophore d'*Arachis hypogaea* L. [Microbiology of the gynophore of *A. hypogaea*.]** *Agricultura, Lowain 1960*, 8, No. 3, 401-8, bibl. 8, illus., English and Flemish summaries. [Lab. INÉAC, Yangambi, Congo]

The gynophore (peg) of groundnuts has the anatomy of a stem, but resembles a root in its microbiology and its capacity to absorb nutrients. The authors found no increase in the numbers of moulds or bacteria on the gynophore of groundnuts, but in the proximity of the gynophore they found an effect similar to the rhizosphere effect. This consists essentially in high values of the R/S ratio (ratio of the number of bacteria of the rhizosphere soil to that of the soil not subject to the influence of the plant) and in an increase in the number of bacteria which require amino acids and growth substances for maximal growth. —E.B.O.

1753 SCHENK, R. U. **Respiration of the developing peanut fruit.** *Crop Sci.* 1961, 1, No. 2, 103-6, bibl. 11. [Georgia Agric. Exp. Sta., Experiment]

The respiration patterns of Virginia Bunch 67 and Dixie Spanish groundnut fruits were found to be similar, except for a more rapid initial and final stage in the latter. The Q_{10} for rate of oxygen absorption was approx. 2.0 between 25 and 32°C (normal developmental temperatures) and declined as temperature increased; a maximum in absorption rate ($Q_{10} = 1$) occurred at about 42°C. Respiration in the developing embryo reached a maximum at about 5.5 weeks. At early stages of development, respiration in the fruit was mainly confined to the shell, which, when under moisture stress, was retarded in growth far more than was the embryo. —R.H.F.

1754 GRESHAM, W. A., Jr. **Bibliography on the technology of peanut production, 1896-1956.** *Spec. Rep. 32 Engng Exp. Sta., Georgia Inst. Tech.* 1957, pp. 256.

Approximately 2400 references are given, with brief abstracts in some instances, under 5 headings which include : sowing and cultivation, 1301 ; harvesting and curing, 235 ; storing and shelling, 148.—R.H.F.

PEAS

1755 COWAN, W. T. and BREESE, T. C. **Chlorpropham/diuron mixtures for pre-emergence weed control in peas, beans and bulbs.** *Proc. 5th Brit. Weed Contr. Conf.* 1960, 115-20, bibl. 1.

1756 REYNOLDS, J. D. **Reaction of pea varieties to commonly used herbicides.** *Proc. 5th Brit. Weed Contr. Conf.* 1960, 101-13, bibl. 10. [Pea Growing Res. Org., Yaxley, Peterborough]

Results are given from experiments in 1958 and '60 to compare the effects of MCPB, proflam, chlorproflam plus fenuron or diuron, dinoseb amine, and TCA and/or dinoseb ammonium applied at 1.3-1.5 times the recommended rate to 14 popular vining and threshing pea varieties. Proflam applied before sowing and the 2 chlorproflam treatments applied before emergence had no adverse effects. Varietal reactions to the other 4 herbicides are tabulated.—R.B.

1757 RATCLIFFE, R. H. and others. **Field experiments on the insecticidal control of insects attacking peas, snap and lima beans.** *J. econ. Ent.* 1960, 53, No. 5, 818-20, bibl. 4. [Maryland Agric. Exp. Sta., College Park]

All quantities are expressed in terms of active ingredient/ac. The pea aphid (*Macrosiphum pisi*) was virtually eliminated by 1 spray application, on 4 June, of methyl trithion at 1.0 lb, dimethoate at 0.25 lb, phosphamidon at 0.25 lb and thiodan at 0.75 lb, to Perfect Freezer 66 peas sown 15 April.—R.H.F.

1758 LOFTENIUS, A. **Laboratoriemetoder för bestämning av sortrenheten hos ärtor. [Laboratory methods for the determination of varietal purity in peas.]** *Medd. Frökontrollanst., Stockh.* 1960, No. 35, 77-84, bibl. 5, illus., English summary.

Two methods are described, one based on the appearance of the first 2 scale leaves and the other on the fluorescence of the radicles. To illustrate the shape and size etc. of the scale leaves, photographs of those of 12 varieties are presented and described. The seeds of yellow peas which had swollen in water were studied for fluorescence of the radicles. Swedish varieties were arranged in 3 groups : (1) nearly all the radicle giving a yellow

fluorescence ; (2) about half of the distal end of the radicle giving a yellow fluorescence ; (3) the radicle having no or only a weak yellow fluorescence. The average percentages of the fluorescence groups in the yellow pea varieties Kloster, Strål and Torsdags III are given. About 800 samples were investigated. F. Eng. s.—G.M.R.

BEANS

See also Abs. 1755.

1759 BULLEN, E. R. and HUGHES, R. G. **NAAS/ARC trials with simazine on field beans.** *Proc. 5th Brit. Weed Contr. Conf.* 1960, 79-89, bibl. 3.

Results of 10 trials on weed control in beans using simazin applied pre-emergence at doses ranging from 0.5 to 2 lb per acre are given. Applications of 0.5 lb simazin gave the highest crop yields at some centres. Higher doses gave improved weed control but this was not necessarily reflected in yields. A tendency towards reduced yields was noted at the highest dose at most centres. No adverse effects were observed in the 1960 wheat crops following simazin treatment to the 1959 bean crops. F. s.—R.B.

1760 GREGORY, P. **The use of simazine on winter sown field beans.** *Proc. 5th Brit. Weed Contr. Conf.* 1960, 65-77, bibl. 6. [Fisons Pest Control Ltd., Chesterford Park Res. Sta.]

Simazin was applied at rates of 2, 1 and 0.5 lb/ac to winter-sown field beans (*Vicia faba*) during the 1959-60 season. Fifteen experiments on different soil types were carried out. Ten were given pre-emergence sprays only in early winter ; the remaining 5 compared winter pre-emergence treatments with spring post-emergence treatments. Soil-moisture conditions over the spraying period were favourable for the action of simazin, and control of annual gramineous and broad-leaved species was excellent. Wild oats (*Avena fatua*) were more effectively controlled by winter- than by spring-treatments. The converse was true of most annual broad-leaved species. The best time for the effective control of blackgrass (*Alopecurus myosuroides*) was dependent on soil type. The probable reasons for these findings are discussed. The experiments confirmed previous findings that damage to field beans may occur at rates of simazin in excess of 1 lb/ac. In these experiments, more damage was observed from winter applications than from spring applications of 2 lb of simazin/ac. Damage was greater on light or chalky soils than on heavy soils. Where the infestation by blackgrass was heavy, significant yield increases accompanied its control by simazin. No yield increases were obtained on light gravelly sand where broad-leaved annuals were dense. On the contrary, on such soils significant yield decreases

were recorded for the winter and spring treatments at the highest rate. In the absence of dense weed infestation on heavy clay soils significant depressions occurred only at the highest winter rate of application. No yield depressions occurred on heavy soil sites heavily infested with wild oats, but increases obtained failed to reach significance. F. S.—R.B.

- 1761 MOFFATT, J. R. and HILL, M. J. **The use of simazine to control weeds in field beans and potatoes.** *Rep. Rothamsted exp. Sta. 1960* Harpenden, 1961, 204–8.

The test crops winter wheat, spring wheat, spring oats, kale and sugar-beet were used to assess residues of simazin and atrazine used for weed control in beans and potatoes in 1959 [experiment described in *Fld Crop Abstr.* 13 : 1764]. No residual effect was detected on germination or subsequent growth of any of these crops. The yields of kale and sugar-beet were slightly depressed following simazin at 1.5 and 1.0 lb/ac compared with 0.5 lb. The higher rates are above normal practice. In a further series of experiments in 1960 at Rothamsted and Woburn, tick beans [*Vicia faba* var. *minor*] were given the treatments : no weed control ; inter-row cultivation ; simazin at 0.5, 1 and 1.5 lb a.i./ac all without cultivation ; and at 1.0 lb a.i./ac with cultivation. At both sites *Polygonum convolvulus* was the only weed controlled satisfactorily by simazin in the bean experiments. The potato experiments also combined simazin with cultivations. In both crops, weed control by cultivation was better than with simazin. The poor results with simazin in 1960 as compared with favourable results in 1959 are [partly] attributed to dry weather in the month following application.

—R.H.F.

- 1762 MOFFATT, J. R. **Report on a series of field experiments testing winter v. spring field beans.** *Rep. Rothamsted exp. Sta. 1960* Harpenden, 1961, 189–91.

A series of trials was carried out at Rothamsted and Woburn, 1956–60, in which S.Q. Giant winter beans [*Vicia faba*] and Albyn Tick (replaced by Granton in 1959 only) spring beans [*V. faba* var. *minor*] were sprayed or not sprayed with metasystox [details not given] for the control of *Aphis fabae*. The average yield of seed in cwt/ac for 1956–9 for the sprayed and non-sprayed plots, respectively, were : winter beans 23.2 and 22.4, spring beans 17.4 and 13.0. It was concluded that winter beans give higher yields than spring beans except when chocolate spot disease (*Botrytis*) or birds cause excessive damage ; in the latter instance spring beans are the more reliable crop. In most years winter beans do not need spraying whereas the spraying of spring beans is nearly always beneficial.—R.H.F.

- 1763 ROBINSON, A. G. **Effects of amitrole, zytron and other herbicides or plant growth regulators on the pea aphid, *Acyrtosiphon pisum* (Harris), caged on broad bean, *Vicia faba* L.** *Canad. J. Pl. Sci.* 1961, **41**, No. 2, 413–17, bibl. 7. [Univ. Manitoba, Winnipeg]

Thirty herbicides or plant growth regulators were tested against the pea aphid (*Acyrtosiphon pisum*) on broad bean (*Vicia faba*). When amitrol a 300, 200 and 100 ppm. a.i. in water was absorbed by the plant roots, fecundity of the adult insects was reduced and mortality of their progeny was 100, 100 and 93.9%, respectively. No significant effects on fecundity occurred when amitrol was applied to the leaves or as a contact spray on adult aphids. When zytron at 3000, 2000 and 1000 ppm. a.i. in water was absorbed by the roots, mortality of adults was 100, 100 and 95% and of their progeny 100, 100 and 98.6%, respectively. When zytron was applied to the leaves at 8000, 4000 and 2000 ppm. a.i. in water there was a mortality of adults of 85, 70 and 50% and of nymphs 75.1, 45.4 and 29.9%. The lower mortality of nymphs occurred over a 5-day period, indicating that the initial toxic effects from application to the leaves were soon lost. Of the other chemicals used, only MH had any effect on aphids [no data given]. F. S.—R.B.

- 1764 SCRIVEN, W. A. and others. **Pollination of field beans.** *Outlook on Agric.* 1961, **3**, No. 2, 69–75, bibl. 2, illus.

A series of trials was carried out on field beans [*Vicia faba*] in Lincolnshire in 1957–60 to assess the effect on pod-setting of foraging bees. Cages measuring 9 × 9 × 6 ft high were set up for use as bee includers or excluders (for caged or free-flying bees). The average yield of threshed beans in cwt/ac for 3 yr was : bees excluded 19.4, bees allowed access 36.3. Pollination requirements are calculated to be satisfied by 1 hive/ac of beans. The interaction of bee pollination and plant spacing is discussed.—R.H.F.

- 1765 LALORAYA, M. M. and NAQVI, S. A. **Auxin gibberellic acid interaction in controlling the hypocotyl growth in seedlings.** *Science* 1961, **133**, No. 3461, 1357–9, bibl. 8. [Univ. Allahabad, India]

Observations on hypocotyl length in *Phaseolus mungo* var T.2, following treatment of the pre-soaked seeds for 3 hr with IBA at 100–200 ppm., with GA at 5 ppm. and with both chemicals together showed that IBA inhibited elongation whilst GA removed the inhibition. It is concluded that a factor determining whether seedling emergence in general is epigeal or hypogeal may lie in the relative abundance of IBA and GA in the germinating seed.—R.H.F.

LUPINS

1766† EFFMANN, H. Beziehungen zwischen Schalenrissigkeit, Anomalien und Keimfähigkeit von *Lupinus luteus*. [Connexion between fissured seed coats, anomalies, and germination capacity of seed of *L. luteus*.] *Z. landw. Vers- u. UntersuchWes.* 1960, 6, No. 5, 466-78, bibl. 19, illus., English and Russian summaries. [Inst. f. Landw. Versuchs- u. Untersuchungswesen, Potsdam, E. Germany]

Nearly 1000 seeds with split seed coats were examined and tested for germination capacity. The fissures occurred lengthwise, crosswise and in both directions. Lengthwise fissures were the most frequent but they reduced seed germination least. Fissures in both directions occurred least frequently and were the most detrimental to germination. The injuries caused by each type of fissure are described. In seed testing, the anomalies caused by these fissures can be determined from the 6th day of test. Further tests for seed certification are recommended. These are concerned with root deformation and the presence of adventitious roots. F. Ger. s.—D.B.

1767† ASAROV, H. K. [Effect of scarification on germination capacity of perennial lupin seed.] [Russian] *Izv. Timirjazevsk. S.-H. Akad. (Bull. Timirjazev agric. Acad.)* 1961, No. 2 (39), 224-7, bibl. 3, English summary.

Scarification, which was carried out by using pounded glass, quartz sand or superphosphate, considerably increased the power and vigour of germination. F. s.—M.H.

CYAMOPSIS TETRAGONOLOBA

1768† MATLOCK, R. S. Guar variety and cultural studies in Oklahoma, 1950-1959. *Proc. Ser. P-366, Okla State Univ.* 1960, pp. 37.

A large number of varieties, selections and hybrids of guar [*Cyamopsis tetragonoloba*] were tested at various localities. The varieties Texsel and Groehler, described in some detail, are recommended; their highest recorded yields of seeds being 1699 and 1900 lb/ac, respectively, and of forage (in another trial) 23,000 and 28,200 lb green matter/ac.—R.H.F.

LABLAB NIGER

1769† RIVALS, P. Le dolique d'Egypte ou lablab, *Dolichos lablab* L. 2. Notes complémentaires. [Egyptian kidney-bean or lablab (*D. lablab*). 2. Complementary notes.] *J. Agric. trop. et Bot. appl.* 1960, 7, No. 9-10, 447-50, illus. [Éc. Nat. Sup. Agron. Toulouse, France]

[See also *Fld Crop Abstr.* 7 : 878.] These notes are concerned with : (a) a lablab specimen

in Kew Herbarium which has abnormal pods ; (b) points of nomenclature ; (c) effect of TIBA, which was nil, on the flowering of lablab. As to (b), the author in Part I had proposed the subspecies *bengalensis*, *lablab* and *ensifomis* for *Dolichos lablab* ; with regard to the use of the genus name *Lablab* instead of *Dolichos*, he now states that the characters defined for *Lablab* do not apply to varieties of the subspecies *bengalensis* and *ensifomis*. —E.B.O.

GENERAL

1770† COTTE, A. Les variétés de légumineuses annuelles. [Varieties of annual legumes.] *Fourrages* 1961, No. 5, 106-34, bibl. 14. [Éc. Nat. Agric., Montpellier, France]

Information is given on varieties included in the official French catalogue, and on results of cultural trials at various stations in France, for each of the following annual fodder legumes : vetch (winter type and spring type), field beans and peas.—E.B.O.

1771 MASEFIELD, G. B. Root nodulation and agricultural potential of the leguminous genus *Psophocarpus*. *Trop. Agric. Trin.* 1961, 38, No. 3, 225-9, bibl. 4. [Univ. Oxford, Field Sta.]

In pot experiments carried out in a glasshouse at various temperatures, 5 plants of *Psophocarpus tetragonolobus* were grown in soil treated with ground, dried nodules obtained from a previous planting at Oxford of the same species similarly inoculated with material obtained in Malaya. At the highest temperature, 80°F, the average number and fresh weight of nodules produced/plant at 109 days was 627 and 25.6 g ; the largest was 1.2 cm in diameter and weighed 0.60 g. All of the nodules examined had red internal tissue. A similar trial with *P. palustris* gave an average number and weight of nodules/plant of 35 and 11.76 g, respectively ; the largest was 1.0 cm in diameter and weighed 0.23 g. Only a few had red internal tissue. In view of the high capacity for nodulation shown by *P. tetragonolobus* it is suggested that this species has some potential, in addition to its common use as a vegetable, as a [short term] perennial regenerative fallow crop in the wet tropics and, to a lesser extent, as a green manure, fodder or cover crop. [See also *Fld Crop Abstr.* 10 : 1427.]—R.H.F.

ROOT CROPS

SUGAR-BEET

1772 RYMARENKO, V. S. and BOGDAN, P. I. Efficiency of various methods of mono-

germ sugar-beet cultivation in the Altai. [Russian] *Vestn. S.-H. Nauki (J. agric. Sci. USSR)* 1961, 6, No. 3, 11–15, English, German and French summaries.

1773† HAMMERTON, J. L. **Studies of the effects of soil aggregate size on the emergence and growth of beet (*Beta vulgaris* L.). 2. Leaf development.** *J. agric. Sci.* 1961, 56, No. 3, 417–29, bibl. 8.

[For Pt 1 see *Fld Crop Abstr.* 14: 1244.] Observations on the influence of soil aggregate size on the leaf development of seedlings of sugar-beet and fodder-beet up to the singling stage of growth (about 4 leaves per plant) are reported in this article. Plants grown on a fine soil separate produced more and larger leaves than those grown on coarser separates. Plants of fodder-beet variety Red Øtofte had a greater leaf number per plant than plants of any of the sugar-beet varieties grown. Polyploid sugar-beet seedlings had larger leaves than diploid seedlings.—E.B.O.

1774 RJABUŠKO, P. D. [The effect of black fallow (= weedy fallow) on yield of seeds of monogerm sugar-beet, and on their productive qualities.] [Russian] *Sahar. Promyš. (Sugar Industry)* 1961, 35, No. 5, 46–8.

Experiments made during 1959–60 at the Jaltuškovsk Experimental Centre showed that sowing monogerm sugar-beet on a weedy fallow increased seed harvests by an average of 600 kg/ha and the yield of the subsequent beet crop by 700–1300 kg/ha when compared with sowing on a clean fallow after a winter cereal.—M.H.

1775† JOSEFSSON, A. Gallringsförsök med rotfrukter. Undersökningar rörande sambandet mellan avkastning och olika antal dubbelplanter. **Thinning experiments in root crops. Studies of the relation between yield and number of double plants.** *Sverig. Utsädesfören. Tidskr.* 1960, 70, No. 4–5, 294–311, illus., English summary.

Experiments were conducted from 1957 to 1959 with 3 varieties of beet and 2 of swedes involving normal thinning and 4 treatments which left double plants at every 16th, 8th, 4th or 2nd plant place. Differences in yield of roots between the different thinnings were remarkably small, especially in the beet. The sum of yields of roots and tops was the same for all the treatments. The yield of tops was highest where there were most double plants. In the case of swedes there were no evident differences in top yield between the different thinnings. Dry-matter content was a little higher in the double plants than in the singles, and dirt tare was greater. The roots of the double plants varied greatly in weight as well as in shape, the average weight of individual roots in

the pair being 61% of that of single plants. The weight of the single roots was influenced by the number of double plants, so that when this was 25% of the total number of plants, the weight of the single roots was 93% of that under normal thinning, and where double plants comprised 50% of the total, single root weight was only 87% of that under normal thinning. F. Eng. s.—G.M.R.

1776 ADAMS, S. N. **The effect of sodium and potassium fertilizer on the mineral composition of sugar beet.** *J. agric. Sci.* 1961, 56, No. 3, 383–8, bibl. 3. [Rothamsted Fld Sta., Dunholme, Lincoln]

In plot trials in 1942–3 to compare the effects of KCl and NaCl on sugar beet, the plants were harvested at intervals throughout the growing seasons and analyzed for their content of N, K, Na, Ca, Mg and Mn. The application of salt increased significantly root yield in both years and the yield of tops in 1942. Potash increased the uptake and concentration of K in the plant, but did not increase yield. Na and K were differently distributed in the plant. At harvest, only 6% of the plant's Na was in the root, compared with 33% of the K. Until late Aug. the K content, but not the Na content, was higher in the petiole than in the lamina. This indicates that Na is a nutrient, and not a K substitute, for beet.—E.B.O.

1777 MICZYŃSKI, J. and SIWICKI, S. Międzyplony nawozowe w uprawie buraków cukrowych. Część 2. Wsiewki międzyplonowe. **Manurial catch crop in the cultivation of sugar-beet. 2. Catch-crop seedlings.** *Roczn. Nauk rol.* 1960, 83, Ser. A, No. 2, 311–48, bibl. 21, English and Russian summaries. [Plant Breed. Acclim. Inst., Bydgoszcz, Poland]

The response of sugar-beet to a green-manure catch-crop of (a) red clover [*Trifolium pratense*] (b) yellow trefoil [*Medicago lupulina*] + Swedish clover [*Trifolium hybridum*] and (c) [*Melilotus alba*] + yellow trefoil ploughed in in the autumn with or without 200 q f.y.m. was investigated, 1947–51. It was found that the effect of the green manures was never less than that of the f.y.m.; the average response in metric tons/ha was roots 3.7 and tops 7.3. Green manuring reduced the sugar content of the roots but increased sugar yield/ha. The effect of each of the 3 catch crops was similar but (c) was superior under dry conditions. A residual effect was detected in barley following the sugar-beet; increases of grain, 1.6–2.7 q/ha, and straw, 2.2–3.7 q/ha, being obtained. The combined responses of beet and barley were greatest following (b) and least after (a). F. Eng. s.—R.H.F.

1778 DOLJA, V. S. **The effect of spraying sugar-beet seed crops with chemical**

substances on yield and quality of the seed.] [Russian.] *Selekt. Semenovod. (Select. Seed Prod.)* 1961, 26, No. 3, 16-18. [All-Union Sci. Res. Inst. Sugar-Beet]

To obviate the labour involved in removing the tips of the flowering stems (a means for improving yield and quality of sugar-beet seed), it is recommended that the crop be sprayed with MH, at a concentration of 0.01%, at the beginning of flowering.—M.H.

1779 MONTARULI, A. and IMBÒ, P. Confronto culturale fra marche di bietola primaverile in tipici ambienti della Puglia e della Lucania. [Comparison of sugar-beet varieties grown in spring in typical environments of Puglia and Lucania (S. Italy).] *Industr. saccar. ital.* 1961, 54, No. 3-4, 57-72, bibl. 12, English summary. [Ist. Agron. Univ. Bari]

The cultivation of sugar-beet is increasing in S. Italy where it is grown either without irrigation in autumn-winter or with irrigation in spring. While no great problems are presented by irrigated cultivation, it is often impossible to sow the non-irrigated sugar-beet in Oct. because of insufficient or too heavy rainfall. In trials in Puglia and Lucania to study the possibility of growing sugar-beet in spring without irrigation, several Italian and foreign sugar-beet varieties were sown in Feb. or March. Results showed that sugar-beet can be grown in spring without irrigation in limited areas only of Puglia and Lucania, where the soils are deep and have a good moisture supply. The varieties Mezzano P, Klein E, Pedigree E, Mezzano NP and Maribò Poly gave the highest yields of roots and sugar.—E.B.O.

1780 BAGNALL, B. H. and others. Field trials with endothal/propham for the control of seedling weeds in sugar beet. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 23-30, bibl. 3. [Murphy Chem. Co. Ltd, Wheathampstead, Hertfordshire]

A mixture of 4 parts a.e. endothal and 3 parts a.e. propham at 3 different rates was applied at times of drilling sugar-beet on a wide range of soil types. Twenty-one trials were carried out to cover as wide a range of conditions as possible. Application of a 7-in. band of spray applied immediately behind the rear wheel of the seed-drill units generally proved to be as effective as overall spraying by hand. The three rates of use were shown to be necessary to allow for variation in soil type. Absence of rain during the last half of April 1960 demonstrated that reliable results can be expected only where a reasonable amount of rainfall occurs during the period between drilling and emergence of the beet. F. s.—R.B.

1781 MURANT, A. F. and CUSSANS, G. W. Pre-emergence weed control in sugar beet:

experiments in 1959 and 1960. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 31-45, bibl. 3. [Norfolk Agric. Sta., Sprowston]

In 7 replicated trials in 1959 confirmation of earlier results was obtained with pre-emergence applications of endothal and mixtures of 4 parts endothal and 3 parts propham in sugar-beet. Endothal was effective at all doses (4, 6, 9 lb/ac) against *Polygonum aviculare*, *P. convolvulus*, *Stellaria media*, *Matricaria maritima* ssp. *inodora*, *Senecio vulgaris*, *Anagallis arvensis*, *Capsella bursa-pastoris*, *Viola tricolor*, *Papaver rhoeas*, *Poa annua*, *Rumex crispus* and *Veronica persica*. The endothal/propham mixture controlled all the above species well and gave improved control of *Stellaria media* and *Avena fatua*.—R.B.

1782 COOMBE, A. and DUNDAS, J. Post-emergence nitrate of soda sprays for combined nitrogenous fertilization and weed control in sugar beet. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 47-52, bibl. 11.

This paper is a review of the literature. Effective weed control is obtainable in sugar-beet fields by post-emergence spraying with 2.5-3 cwt nitrate of soda in 65-100 gal water plus spreader/ac. The spray is most effective if applied when the beets have not more than two true leaves and the weeds are not beyond the cotyledon or small-rossette stage, and if preceded by good growing weather and followed by at least 24 hours' dry warm weather. F. s.—R.B.

1783 ALLEY, H. P. and others. The effects of dalapon on pectic substances and on root growth of sugar beets. *J. Amer. Soc. Sug. Beet Technol.* 1961, 11, No. 5, 365-75. [Wyoming Agric. Exp. Sta., Laramie]

In a glasshouse and field study, sugar-beet seedlings at the 2-4 leaf stage were treated with dalapon at the rate of 0, 6 and 10 lb a.i./ac. At the highest rate the stand and growth of surviving plants were significantly reduced. The percentage of alcohol-insoluble solids in the roots was considerably increased by dalapon at 17 days after treatment but not at 50 days. The amount of pectic substance in the whole plant was considerably reduced by dalapon (for at least 50 days after treatment at 6 lb/ac). At 50 days after treatment with the 6-lb rate, the amount of foliage was equal to, but root growth only 60% of that of untreated plants.—R.H.F.

1784 VAN STEYVOORT, L. La jaunisse de la betterave. Résultats des essais sur insecticides systémiques effectués en Belgique de 1956 à 1959. [Sugar-beet yellows. Results from trials on systemic insecticides in Belgium during 1956-9.] *Publ. tech. Inst. belge Amélior. Better.* 1960, 28, No. 2, 65-113, English and Flemish summaries. [Inst. Betterave, Tirlemont, Belgium]

As a result of these trials it is recommended that one treatment with a systemic insecticide be applied to sugar-beet crops in areas where 20–40% of the plants are usually affected by yellows. This treatment, which in most years increases root yield by at least 0.5 tons/ha, must be given when the first *Myzus persicae* appear on sugar-beets (0.2–1 *M. persicae* per plant). A second treatment should be given 12–15 days later in areas where the percentage of yellows is usually more than 40–50%. Of the preparations tested dimecron at a minimum rate of 1 l/ha and rogor were effective.

—E.B.O.

1785 REYNOLDS, H. T. and others. **Effect of topical applications of granulated systemic insecticides and of conventional applications of other insecticides on control of insects and spider mites on sugar beet plants.** *J. econ. Ent.* 1960, 53, No. 5, 725–9, bibl. 3.

The practice of autumn sowing of sugar-beet in the Imperial Valley district of California may lead to heavy insect infestations in the spring. The experiments reported show that 2% phorate at 55 lb/ac and 2% di-syston at 80 lb/ac, both applied as granules in early May to plant crowns, controlled green peach aphid (*Myzus persicae*), southern garden leaf-hopper (*Empoasca solana*) and spider mite (*Tetranychus cinnabarinus*), which are the 3 most important pests in that area.—R.H.F.

1786 GOODMAN, P. J. and others. **[Leaf-area duration and net assimilation rate in sugar-beet.]** *Rep. Rothamsted exp. Sta.* 1960 Harpenden, 1961, 96.

In a study of sugar-beet grown at 4 sites with and without N it was found that yield of dry matter was correlated with leaf-area duration and that net-assimilation rate varied inversely with yield. This effect was ascribed to the increased mutual leaf shading resulting from the increased leaf area of higher-yielding stands.—R.H.F.

1787 BARBOUR, R. D. and WANG, C. H. **Carbohydrate metabolism of sugar beets 1. Respiratory catabolism of mono and disaccharides.** *J. Amer. Soc. Sug. Beet Technol.* 1961, 11, No. 5, 436–42, bibl. 7.

1788 PETERSON, D. F. **Effect of gibberellic acid on sucrose, purity and weight of sugar beets.** *J. Amer. Soc. Sug. Beet Technol.* 1961, 11, No. 4, 320–2, bibl. 5. [Holly Sugar Corp., Sheridan, Wyoming]

In 1958 and 1959 sugar-beet plants were sprayed with GA in the last half of June. Single and multiple applications of 10 or 100 ppm. produced no crop response. Two, 3 and 4 applications of 500 ppm. tended to reduce tonnage, sucrose, sugar per acre and thin-juice purity and to increase

the percentage of bolters. [See also *Fld Crop Abstr.* 13 : 768.] F.S.—R.H.F.

1789 ULRICH, A. **Variety climate interactions of sugar beet varieties in simulated climates.** *J. Amer. Soc. Sug. Beet Technol.* 1961, 11, No. 5, 376–87, bibl. 10. [Earhart Plant Res. Lab., Pasadena, California]

The sugar-beet varieties US 22/3 and US 35/2 (both resistant to curly-top virus disease) and Klein E and Klein ZZ (both non-resistant) were grown in a phytotron under 4 simulated climates in which the temperatures in °C from 8 a.m. to 4 p.m. and 4 p.m. to 8 a.m., respectively, were : cold, 17 and 12 ; cool, 20 and 14 ; warm, 26 and 20 ; and hot, 30 and 22. Results are given in terms of root weight, root sucrose content and foliage production. The yield of root did not differ significantly under cool, warm or hot conditions for the 2 yield-types Klein E and US 22/3 and the sugar-type US 35/2, but under cold conditions the latter 2 varieties yielded 50% of Klein E. Klein ZZ, a sugar-type, gave the poorest growth under all conditions. The yield of tops and the sucrose content of the root in the US varieties and Klein E were similar at all treatments and the sucrose content highest of all entries in Klein ZZ under the cold treatment.—R.H.F.

1790 STOUT, M. **A new look at some nitrogen relationships affecting the quality of sugar beets.** *J. Amer. Soc. Sug. Beet Technol.* 1961, 11, No. 5, 388–98, bibl. 33, illus.

POTATOES

See also *Abs.* 1761.

1791 WISCONSIN AGRICULTURAL EXPERIMENT STATION. **[Potatoes.]** *What's new in Fm Sci., Wis.* 1959, Pt 2, 43–53, illus.

When potato rows were spaced 18 in. apart, 44% of the tubers were of seed size (1.5–2.5 in. diam.) while at the standard between-row spacing of 3 ft, only 29% of the tubers were of this size. A solution of 1 part urea formaldehyde concentrate (1 lb N/gal, 60% formaldehyde) and 2 parts water sprayed at a rate of 40 gal/ac directly in the row at planting gave good control of potato scab [*Actinomyces scabies*] and also increased yields.—A.M.H.

1792 ANTCHIEV, T. **Les résultats des expériences de la plantation de la pomme de terre à grandeur différente des tubercules. [Results of experiments in the planting of different sized potato tubers.]** *Yearb. Fac. Agric. For. Skopje* 1959, 12, 279–92, bibl. 12. [Univ. Skopje, Yugoslavia] [Received Feb. 1961]

Comparison was made of planting whole potato tubers, of the Bintié [Bintje] variety weigh-

ing 40–60 g, 60–80 g and 80–120 g, and half-tubers longitudinally cut weighing 80–120 g. At Trubarevo, near Skopje, on alluvial sandy clay, the trial lasted 5 years, and the tubers and half-tubers were planted separately at a spacing of 70 × 40 cm. At Ramno, at 1390 m alt., the trial lasted 4 years, and the whole tubers were planted separately at a spacing of 70 × 50 cm and the half-tubers were placed 2 in a hole, each hole being 15–20 cm apart. In the first 2 yr of the trials, there was no difference in the yield of whole-tuber treatments, but in subsequent years the yields were greatest when the largest tubers were planted. Total yield at Ramno was reduced by 9.5% when cut tubers were used. In both localities starch content was highest in the potatoes grown from smaller tubers. F. Fr. s.—G.M.R.

1793 **ESCRIBANO, I. F.** El porcentaje de "fallos" y las cosechas. [The percentage of failures and yields (of potatoes).] *Ann. Inst. nac. Invest. agron.* 1960, 9, No. 2, 385–420, English summary. [Esta. Mejora Patata, Vitoria, Spain]

Field trials were carried out over several years to study the influence on potato yield of the percentage of plants failing to emerge. Several varieties and different spacings were used. With failures up to 15%, both yield and the number of tubers produced (per plant and per ha) were not affected. When failures exceeded 15%, yields were significantly reduced.—E.B.O.

1794 **BRILL, G. D. and others.** Irrigation and soil management studies with potatoes in New Jersey. *Bull. 797 New Jersey agric. Exp. Sta.* 1961, pp. 14, bibl. 14. [Vegetable Res. Fm, New Brunswick]

From 1946 to '55, Katahdin potatoes were grown in (a) continuous cultivation (with a winter-wheat cover crop), (b) a 2-yr rotation with wheat, (c) a 3-yr rotation with wheat and grass (hay). When the available moisture (0–8 in.) was 40–45% depleted, 1 in. of water was applied to half of each plot by overhead irrigation. The average yields in bu/ac for 8 yr (1946 and '8 omitted) for the above treatments were (a) 247, (b) 292 and (c) 303. The average for irrigated plots was 323 and for non-irrigated 238. Yields in (b) and (c) were similar under irrigation, but without irrigation the yields were 239 and 265, respectively. The taste and quality of the tubers was improved in (b) and (c) in 3 out of 5 yr and by irrigation in dry years.—R.H.F.

1795 **MINISTRY OF AGRICULTURE, NORTHERN IRELAND.** Potato variety trials. *Res. exp. Rec. Minist. Agric. N. Ire.* 1959 [n.d.], 9, Pt 2, 273–4 and 281. [Greenmount Agric. and Hort. Coll., Muckamore]

The highest yielding variety in each group and its average yield in tons/ac for the 6-yr period 1954–9 were: first early, Arran Pilot, 17.5; second early, Craig's Royal, 17.65; early maincrop, Dr. McIntosh, 17.8; maincrop, Ulster Supreme, 17.2. The highest amount of chats (less than 1.25 in.), 9 cwt, was given by Arran Pilot and the lowest, 2 cwt, by Ulster Supreme. The highest yield of ware potatoes (over 1.75 in.) was given by the early maincrop variety Arran Banner at 16.65 tons/ac. In another series of trials reported, 8 maincrop varieties were grown at 17 sites in N. Ireland in 1959 using seed all grown at 1 site from selected stocks of comparable health and vigour. The yield of tubers in tons/ac for the highest, Ulster Glen, and the lowest yielder, Majestic, respectively, were: ware, 17.01 and 13.58; seed (1.25–1.75 in.), 2.05 and 2.28; chats, 0.45 and 0.36; diseased, 0.4 and 0.36; total, 19.91 and 16.58.—R.H.F.

1796 **UBILLOS, M. M.** Pequeña historia de cinco variedades españolas. [Brief history of 5 Spanish varieties.] *An. Inst. nac. Invest. agron.* 1960, 9, No. 2, 335–57, bibl. 7, illus., English summary. [Esta. Mejora Patata, Vitoria, Spain]

Descriptions are given of the new potato varieties Turia, Victor, Goya, Olalla and Duquesa which have been included in the Spanish register of varieties.—E.B.O.

1797 **OLSEN, O. A.** Potato wart investigations in Newfoundland. *Canad. Pl. Dis. Survey* 1961, 41, No. 3, 148–55, map. [Exp. Fm, St. John's West, Newfoundland]

The resistance to wart disease (*Synchytrium endobioticum*) of 111 named potato varieties and 300 numbered potato seedlings was evaluated during 1950–60. Those with the highest resistance were Kennebec, Sebago, Ultimus, Urgenta and F 5318. Results from trials during 1958–60 indicated a positive correlation between rainfall and the severity of infection.—R.B.

1798 **BAGNALL, R. H.** Potato virus F latent in an imported variety and resistance to the virus in an interspecific potato hybrid. *Phytopathology* 1960, 50, No. 6, 460–4, bibl. 22. [Canada Dept Agric. Res. Sta., Fredericton, New Brunswick]

Apparently healthy plants of the Dutch potato var. Albion from various stocks all originating from tubers imported into the USA in 1934 were all found to contain virus F. A hybrid between *Solanum tuberosum* var. Epicure and 4n *S. chacoense* was found to be highly resistant to this virus.—R.B.

1799 **JOHANSEN, R. H. and others.** New Snowflake potato. *N. Dak. Fm Res.* 1961, 21, No. 10, 26–7, illus.

The white-skinned variety Snowflake is early maturing, resistant to virus, yields well and has good cooking qualities, especially for chipping.—R.H.F.

1800 PICHA, B. Erli-red, a new early variety of potato with bright red tuber color and superior market attractiveness. *Amer. Pot. J.* 1961, 38, No. 3, 78–80, illus.

1801 AKELEY, R. V. and others. Redskin, a new red variety of potato resistant to scab, with high yielding ability, and adapted to growing conditions in the South. *Amer. Pot. J.* 1961, 38, No. 3, 81–4.

1802 ESTRADA, R. N. Nuevas variedades de papa para Colombia y producción de semilla inspeccionada. [New potato varieties for Colombia and production of inspected seed.] *Agric. trop., Bogotá* 1960, 16, No. 12, 783–7. [Cent. Nac. Invest. Agríc., Tibaitatá, Colombia]

Information is given on the new potato varieties Diacol-Monserrate, Diacol-Cumbal, Alfa and Diacol-Guadalupe.—E.B.O.

1803 RANJEL, C. E. and others. Diacol-Cumbal una nueva variedad de papa. [Diacol-Cumbal, a new potato variety (in Colombia).] *Agric. trop., Bogotá* 1960, 16, No. 12, 788–95, illus. [Granja Agríc. Exp. Obonuco, Nariño, Colombia]

1804 DEPARTMENT OF AGRICULTURE, NEW SOUTH WALES. Bungama—new potato variety. *Agric. Gaz. N.S.W.* 1961, 72, Pt 4, 195 and 212.

Bungama, derived from Katahdin, is a white-skinned, mid-season variety adapted to all potato-growing areas in N.S.W. Its advantages include consistent high yield, uniform well shaped tubers that store well, and tolerance to major diseases and a wide range of rainfall.—R.H.F.

1805 FERRARINI, E. Le erbe infestanti di alcune colture presso Marina di Carrara. [Weeds of some crops near Marina di Carrara (Italy).] *Nuovo G. bot. ital.* 1959 (1961), 66, No. 4, 633–55, bibl. 14, English summary. [Ist. Bot., Fac. Agr., Univ. Firenze, Italy]

This study was carried out in 1955 on land situated near the seashore and recently brought under cultivation. The weeds of various crops (including potatoes) were surveyed every month by Raunkiaer's method. Their frequency throughout the year and period of flowering are shown. The influence of climate (mild winters), the sandy soil and the crop on weed development is examined.—E.B.O.

1806 WOOD, C. A. and others. Trials of chemical weedkillers in potatoes. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 59–64, bibl. 6. [Scottish Hort. Res. Inst., Mylnfield, Invergowrie, Dundee]

Dinoseb-amine, applied in 1959 at 6 lb/ac to the ridged drills shortly before the emergence of the crop, successfully replaced cultivations as a means of weed control and caused no reduction of crop yield. The results largely confirmed North American experience. Preliminary tests on cooked tubers suggested that slight tainting might have been caused by certain of the treatments. Tubers from all treatments sprouted normally in the spring after harvest. F. S.—R.B.

1807 ROBERTSON, I. M. The use of herbicidal sprays on the potato crop. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 55–7, bibl. 4. [NIAE Scot. Sta., Howden, Mid Calder, Midlothian]

The passage of tractor wheels over potato land can increase the number of clods and render more difficult the separation of tubers on a potato harvester. A technique has been evolved which reduces to a minimum the number of tractor operations. A fine tilth is produced before planting and inter-row cultivation eliminated by replacing mechanical with chemical methods of weed control. In three seasons of widely differing climatic conditions a mixture of 6 lb dinoseb and 10 lb TCA/ac has given a uniformly high standard of weed control. With an early variety more rapid tuber formation and a slightly increased yield have been obtained; with a late variety yields have remained unaffected. In all cases the clod content has been reduced. Tasting trials have failed to detect any taint from the herbicide. F. S.—R.B.

1808 LAST, F. T. Control of potato blight. *Rep. Rothamsted exp. Sta.* 1960 Harpenden 1961, 152.

The following fungicides were sprayed on potatoes for the control of *Phytophthora infestans*: Zn ethylene bisdithiocarbamate at the rate of 1.3 lb a.i., Cu oxychloride at 2.5 lb a.i., and triphenyl Sn acetate at 0.75 lb a.i. in 100 gal water/ac. Severe blight developed on the unsprayed control plots. The fungicides delayed the destruction of the foliage (to the 50% stage) by 8, 10 and 18 days, respectively, and yields were increased 0.4, 1.0 and 3.8 tons/ac over the control (9.9 tons/ac). The Sn compound was somewhat phytotoxic.—R.H.F.

1809 DE BRUIN, T. Invloed van machinaal loof-trekken op aantasting van aardappelknollen door *Phytophthora infestans* (Mont.) de By. [Effect of mechanical haulm-pulling on infection of

tubers by *P. infestans*.] [Abstract] *Tijdschr. PlZiekt.* 1961, 67, No. 2, 65.

Under weather conditions favouring late blight, the incidence of tuber infection was reduced by half where a chemical defoliant was used in place of haulm pulling, and was increased where the pulled haulms were left on, instead of between, the ridges. Spraying the ridges with Cu reduced tuber infection by 20%. In dry weather, defoliation had no significant advantage over haulm pulling.—R.B.

1810 SCHULTZ, T. H. and others. Urea formaldehyde concentrate-85 for scab control in potatoes. *Amer. Pot. J.* 1961, 38, No. 3, 85-8, bibl. 4. [Wisconsin Agric. Exp. Sta., Madison]

Good control of scab (*Streptomyces scabies*) on 5 susceptible varieties was obtained by applying 30-40 gal of a 33.3% aqueous solution of UFC-85 to seed potatoes in the furrow before covering them. UFC-85 contains 26% of urea and 60% of formaldehyde.—R.H.F.

1811 LABRUYÈRE, R. E. Het gedrag van schurft en *Rhizoctonia* bij aardappel in de nieuwe polder Oostelijk Flevoland. [The behaviour of scab and *Rhizoctonia* on potatoes in the new Eastern Flevoland polder.] [Abstract] *Tijdschr. PlZiekt.* 1961, 67, No. 2, 65.

Potatoes infected with scab [*Streptomyces scabies*] and normally disinfected [disinfectant not stated], or infected with both scab and *Rhizoctonia solani* and heavily disinfected, were compared with diseased undiseased tubers in a 3-year field trial in Eastern Flevoland. Results showed that heavy disinfection controlled *Rhizoctonia* but not potato scab.—R.B.

1812 DE BOER, S. Nieuwe mogelijkheden voor de bestrijding van *Rhizoctonia solani* Kühn bij aardappelen. [New possibilities for controlling *R. solani* in potatoes.] [Abstract] *Tijdschr. PlZiekt.* 1961, 67, No. 2, 65.

Maize meal [rate not stated] applied to infected soil reduced the incidence of *R. solani* and scab [*Streptomyces scabies*] in potatoes. On uninfected soil, a mixture of maize meal and *Trichoderma* sp. applied before planting tubers infected with *R. solani* strongly inhibited the carry-over of infection to the following potato crop.—R.B.

1813 PEACHEY, J. E. [Control of nematodes infecting potatoes.] *Rep. Rothamsted exp. Sta.* 1960 Harpenden 1961, 136-8.

In trials at Woburn, the yield of potatoes [variety not stated] was doubled when the soil was treated against potato-root eelworm [*Heterodera rostochiensis*] with vapam at the rate of 1 pint/

50 sq. ft before planting. There was a decrease in nematode invasion of the roots.—R.H.F.

1814 SCHMIDT, O. Möglichkeiten der Kartoffelnematodenbekämpfung mit Hilfe von Trapeex. [Possibilities for controlling potato nematodes (*Heterodera rostochiensis*) with trapeex.] *Kartoffelbau* 1961, 12, No. 5, 110-12, bibl. 10, illus.

1815 KERR, T. W., Jr. The three-lined potato beetle and its control. *Misc. Publ.* 58 Rhode Is. agric. Exp. Sta. 1961, pp. 6, illus.

This insect, *Lema trilineata*, which defoliates potatoes, has become an increasingly important pest in Rhode Island since 1956, co-incident with the substitution of dieldrin for DDT in the spraying programme. Full control can be effected by spraying, in late May or early June, with 1 lb of 50% sevin (wetttable powder), 2 lb of 50% DDT (wetttable powder) or 0.5 gal 25% DDT, in 100 gal water/ac.—R.H.F.

1816 BACON, O. G. Systemic insecticides applied to cut seed pieces and to soil at planting time to control potato insects. *J. econ. Ent.* 1960, 53, No. 5, 835-9, bibl. 7.

In trials conducted at Shafter and Davis in 1957, and at Davis and Stockton, California, in 1958, good control of *Myzus persicae* was obtained for 77 days when cut seed tubers of White Rose potato were treated with 2.6 oz of 50% di-syston in activated charcoal formulation/100 lb tubers; 2.6 oz of 44% phorate/100 lb tubers gave slightly less control. When 100 lb of 2% granules of di-syston or phorate/ac were applied in the furrow, *M. persicae* was controlled for 86 days and *Empoasca filamenta* for 94 days (phorate again giving slightly less control). Plant emergence was considerably reduced by these treatments but less so when the chemicals were applied as granules either in the row or with fertilizers in bands away from the tubers.—R.H.F.

1817 BÉRES, J. Adatok a burgonya leromlásának okaihoz. [On causes of potato degeneration.] *Agrokémia és Talaj.* 1960, 9, No. 4, 535-48, bibl. 19. [MTS, Kiszvárd, Hungary]

This article reports on studies of potato degeneration as affected by soil conditions and nutritional practice. F. Ger. s.—G.M.R.

1818 BOOY, A. H. Verband tussen nachtvorstschade aan aardappelen en bodemgesteldheid op Drentse dalgrond. [Relationship between ground-frost damage to potatoes and soil characteristics on peaty soil in Drente.] *Landb Voorl.* 1961, 18, No. 1, 10-18, bibl. 17, illus. [Sticht. Bodemkartering, Bennekom, Netherlands]

Maps of ground-frost damage to potatoes in Drente in June 1955 indicated a correlation between damage and soil type. Maps of further frost damage in June 1957 showed that the relationship between damage and soil type was the same as it had been in 1955. The cause of this relationship was that the various soil types differed in heat capacity and heat conductivity. Frost damage was severe where the plough layer was shallow, on peat soils without sand, on well drained and dry plots and where loose peat had been ridged. Damage was slight on soils with shallow loam near the surface, with a deep plough layer or where sand was mixed with the peat, and on wet land. Areas bordering canals also escaped frost damage. F. s.—R.B.

1819 OCHOA, C. Una variedad nueva de *Solanum multiinterruptum* Bitt., especie tuberífera peruana poco conocida. Nuevas especies de *Solanum* (Tuberarium subsec. Hyperbasarthrum) del Perú. [A new variety of *S. multiinterruptum*, a little-known Peruvian tuberiferous species. New species of *Solanum* (Tuberarium, subsec. Hyperbasarthrum) of Peru.] *Agronomía, Lima* 1960, 27, No. 3, 242–5, and No. 4, 363–72, illus.

1820 CHAPMAN, H. W. and CLEGG, M. D. Rooting of potato cuttings. *Amer. Potato J.* 1961, 38, No. 5, 158–62, bibl. 6, illus. [Colorado Agric. Exp. Sta., Fort Collins]

Excellent rooting of several varieties of potatoes was obtained when apical vine cuttings, 4–6 in. long, were dipped in rootone (a naphthylacetic acid formulation) or fermate (Fendimethyldithiocarbamate) and placed in a perlite medium with full light and intermittent mist or in sand under shade, provided waterlogging was avoided. Rooting occurred within 2–3 weeks.—R.H.F.

1821 ŚWIEŻYŃSKI, K. Zmienność ziemniaków przy rozmnażaniu wegetatywnym. Clonal variation in potatoes. *Roczn. Nauk rol.* 1960, 81, Ser. A, No. 2, 415–20, bibl. 2, Russian and English summaries.

Healthy potatoes were reproduced for 3 years (a) in a glasshouse and (b) in the field, and afterwards grown in the field. Only a small proportion of the glasshouse lines could be maintained free from virus disease. The yield of these lines was the same as that of the lines reproduced in the field. Among lines reproduced in the field almost all were maintained free from virus disease and their yields were equal. Similar experiments with potato seedlings several weeks old, reproduced respectively in the glasshouse and in the field, gave similar results. It is concluded that several years of reproduction in the glasshouse has no

deleterious effect on the yielding ability of potatoes. F. Eng. s.—G.M.R.

1822 HÖLZL, J. and BANCHER, E. Über gelöstes und kristallisiertes Eiweiss in der Kartoffelzelle (*Solanum tuberosum*). [Dissolved and crystallized protein in the potato cell.] *Qual. Plant. et Materiae veg.* 1961, 8, No. 1, 1–24, bibl. 50, illus., English and French summaries. [Techn. Hochsch. Wien, Austria]

It was shown that potato protein (tuberin) is an easily precipitated globulin in the cell sap. Cubic crystals of another globulin are present in the outer cell layers and sometimes in the medulla also. F. Eng. s.—R.B.

1823 VEČER, A. S. and ČAKAĽ, M. T. The dynamics of accumulation of pigments in greening potato tubers. [Russian] *Doklady Akad. Nauk BSSR (Proc. Acad. Sci. Beloruss. SSR)* 1961, 5, No. 5, 223–5, bibl. 8. [Biol. Inst., Acad. Sci. Beloruss. SSR]

In greening potato tubers pigments are formed which are characteristic of the leaves. Chlorophylls *a* and *b* are found in the proportions in which they occur in shaded leaves.—M.H.

1824 HUMPHRIES, E. C. and WHEELER, A. W. Gibberellins in potato leaves. *Rep. Rothamsted exp. Sta.* 1960 Harpenden, 1961, 101.

It is reported that an endogenous GA-like leaf-growth substance is present in potato leaves and affects their growth rate similarly to applied GA.—R.H.F.

1825 MARKOWSKI, A. and POJNAR, E. Pewne aspekty badań okresowej suszy glebowej i współczynników wędnięcia roślin na tle doświadczeń wazonowych z ziemniakami. [Some aspects of the investigation of periodic drought and the wilting coefficient of potatoes.] *Roczn. Nauk rol.* 1960, 83, Ser. A, No. 1, 25–47, bibl. 26, English summary.

Potatoes grown in peat, loam, or sandy soil were subjected to periodic drought. On peat and sand, drought applied during the whole period of growth did not lower yields more than did drought in the middle period of growth (tuber formation to flowering). Full saturation of the soil, under good conditions of aeration, gave higher yields than 60% saturation. Drought during the whole period of growth retarded ripening, but if applied during the last period (flowering to harvesting) [only], ripening was accelerated. F. Eng. s.—G.M.R.

1826 HOOVER, E. F. and XANDER, P. A. Potato composition and chipping quality. *Amer. Potato J.* 1961, 38, No. 5, 163–70, bibl. 5. [Wise Potato Chip Co., Horticultural Section, Berwick, Pa]

This progress report states that in studies during 1958-9, based on 121 samples of potatoes, the only consistent correlation with crisp colour was found to be the content of the reducing sugars, glucose and fructose.—R.H.F.

SWEET-POTATOES

1827 ANDERSON, W. S. More "canners" produced from closely spaced sweet-potatoes. *Miss. Fm Res.* 24, No. 3, 7. [Mississippi Agric. Exp. Sta., State College]

Hill-spacing tests with a canning variety in 1959 and 1960 indicated that the yield of whole canner-grade tubers, 1.5-2 in. thick and not more than 5 in. long, was increased by nearly 100 bu/ac [1 bu = 55 lb] by either twin planting at 12 in. in the row or single planting at 6 in. in the row as compared with the standard practice of single planting at 12 in. in the row.—R.H.F.

1828 MILLER, J. C. and others. Centennial. A new sweet potato variety. *Circ.* 63 *La agric. Exp. Sta.*, 1960, pp. 4, illus.

This is the highest-yielding variety yet developed in Louisiana and is recommended for all areas there. Comparable yields in bu/ac from 30 trials over a 3-yr period were: Centennial, 405.3; Goldrush, 308.6; Unit 1 Porto Rico, 292.8 and Acadian, 248.5. Storage and cooking qualities are good and carotene content particularly high, 17 mg/100 g fresh root.—R.H.F.

1829 SCOTT, F. H. and others. 1960 variety trials, tomato, sweet potato. *Res. Rep.* 47 *Va agric. Exp. Sta.* 1961, 29-40. [Virginia Truck Exp. Sta., Eastern Shore Sub-sta.]

In a trial of 10 sweet-potato varieties (described) the highest yields in lb/ac of: (a) marketable tubers were given by Nugget (402), Centennial (380), Nemagold (365); (b) tubers for fresh market by Nugget (291), Copperskin Goldrush (248), Centennial (245); and (c) tubers for canning by Carogold (169), Nemagold (131) and Jersey Orange (123). Allgold was the lowest yielder in (a) and (b) and 3rd lowest in (c).—R.H.F.

1830 ELMER, O. H. Sweetpotatoes and their diseases. *Bull.* 426 *Kans. agric. Exp. Sta.* 1961, pp. 49, bibl. 7, illus.

Recommendations are given for disease control.—R.H.F.

1831 SHOREY, H. H. and ANDERSON, L. D. Biology and control of the morning-glory leaf miner, *Bedellia somnulentella*, on sweet potatoes. *J. econ. Ent.* 1960, 53, No. 6, 1119-22, bibl. 4. [Univ. California Citrus Exp. Sta., Riverside]

1832 YEN, D. E. Evolution of the sweet potato (*Ipomoea batatas* (L.) Lam.). *Nature, Lond.* 1961, 191, No. 4783, 93-4, bibl. 5.

1833 WILSON, K. A. The genera of the Arales in the southeastern United States. The genera of the Convolvulaceae in the southeastern United States. *J. Arnold Arbor.* 1960, 41, No. 1, 47-72, bibl. and No. 3, 298-317, bibl.

There is a section on *Colocasia*, pp. 56-8, which includes a bibl. of 10 items, and another on *Ipomoea*, pp. 311-16, which includes a bibl. of 58 items.—R.H.F.

CASSAVA

1834 DEPARTMENT OF AGRICULTURE, ZANZIBAR. [Trials with cassava.] *Suppl. Rep. Dep. Agric., Zanzibar* 1959 1960, 11-12.

In a time-of-harvesting trial with the recently selected cassava variety 46106/27, the yield at 18 months (7.21 tons/ac) was significantly higher than that at 12 months (3.81). Local practice is to harvest at 12 months. In a spacing trial, the same variety was planted in rows 5 ft apart at spacings of 3 ft, 4 ft or 5 ft in the row. Each of the closest 2 spacings significantly outyielded the widest in the presence or absence of 20 tons f.y.m./ac.—R.H.F.

1835 PEREIRA, A. S. and others. Teor de ácido cianídrico na polpa das raízes dos aipins. [Hydrocyanic-acid content in the root pulp of cassava.] *Bragantia* 1960, 19, No. 17, 247-59, bibl. 6, English summary. [Esta Exp. Campinas, São Paulo, Brazil]

In Brazil, several varieties of both the sweet cassava (*Manihot aipi*) and the bitter cassava (*M. utilissima*) are grown. Determinations of HCN content of the roots of sweet and bitter varieties were made. The HCN content of the bitter varieties Pitanga and Brava de Itú was on average 3 times that of the sweet varieties. The average content of HCN of the sweet varieties, in mg/100 g dry matter, was: Vassourinha 19, Ipy Tupã 13.5, Santa 13.5, Tatu 20.5, Guaxupé 10.7, Aipim Paraguaio Prêto 6.2 and Branca do Pomar 19.—E.B.O.

YAMS

1836 BURKILL, I. H. The organography and the evolution of Dioscoreaceae, the family of the yams. *J. Linn. Soc. (Bot.)* 1960, 56, No. 367, 319-412, illus.

The main heads of this article are: taxonomy; in search of the remote past; morphology and morphogenesis.—E.B.O.

1837 VIDAL, J. Les plantes utiles du Laos. [The useful plants of Laos.] *J. Agric. trop. et Bot. appl.* 1960, 7, No. 9—10, 417—40, illus.

This annotated list of plants includes 10 *Dioscorea* species.—E.B.O.

1838 ALVES, A. C. and others. Contribuição para o estudo das Dioscoreáceas das nossas províncias ultramarinas. 1. *Dioscorea dumetorum* Pax de S. Tomé. [A contribution to the study of the Dioscoreaceae of the Portuguese overseas provinces. 1. *D. dumetorum* of São Tomé (W. Africa).] *Garcia de Orta, Lisboa* 1960, 8, No. 4, 821—35, bibl. 9, English and French summaries.

This is a study of the alkaloids in tubers of *Dioscorea dumetorum* collected in São Tomé. Of the 2 principal alkaloids present, one was identified as being dihydrosdioscorine, while the other is a compound not yet described for the Dioscoreaceae. As only dihydrosdioscorine had been described by Bevan *et al.* (1956 and 1958) in tubers of *D. dumetorum* from Nigeria, it is suggested that there may be a strong influence of the geographical factor on the composition of this species, or that the plants of São Tomé and those of Nigeria may belong to different and yet unrecognized varieties.—E.B.O.

JERUSALEM ARTICHOKE

1839 COURDURoux, J. C. Le déterminisme de la tubérisation chez quelques variétés de topinambours. [Factors determining tuber-formation in some varieties of Jerusalem artichoke.] *Bull. Soc. bot. Fr.* 1960, 107, No. 7—8, 243—7, bibl. 4.

Experiments showed that the factors which determine tuber-formation in Jerusalem artichoke (*Helianthus tuberosus*) vary with varieties. Some are clearly influenced by the photoperiod (there are both short-day and long-day varieties) while others behave in an identical manner to potatoes, temperature being the principal factor affecting them.—E.B.O.

FIBRE CROPS

COTTON

1840 PORTER, H. G. The cotton industry of Colombia. *For. agric. Ser. M-113 U.S. Dep. Agric.* 1961, pp. 17, illus., 1 map.

1841 RAINGEARD, J. Le coton en Iran. [Cotton in Iran.] *Cot. et Fibr. trop.* 1960, 15, No. 3, 367—75, bibl. 3, illus., English summary.

1842 NICHOLSON, G. E. The production, history, uses and relationships of cotton (*Gossypium* spp.) in Ethiopia. *Econ. Bot.* 1960, 14, No. 1, 3—36, bibl. 154, illus.

1843 LAWES, D. A. Crop physiology. *Progr. Repts Exp. Stas Emp. Cott. Gr. Corp., N. Nigeria* 1959—60 1961, 7—9. [Samaru, N. Nigeria]

Vertical mulching, in which a slit 10 in. deep was drawn in the furrow between ridged cotton before tying and the slit filled with groundnut shells, resulted in an increase of 21·7% in seed-cotton yield over normal tied ridge cultivation which yielded 1026 lb/ac. In another trial of cultivation methods, the following yields in lb/ac were obtained with cotton (seed cotton), sorghum (grain) and groundnuts (shelled nuts), respectively: (a) ridges not tied (control), 576, 1938 and 1087; (b) ridges tied throughout the growing season, 541, 1961 and 1105; (c) as for (b) but alternate furrows left open, 638, 2078 and 1125; (d) as for (b) but ties removed at the height of the rains, 640 (cotton only). Thus the sensitivity of cotton to standing water in the furrows was demonstrated. Alternate ridge-tying has the additional advantage of facilitating tractor operations during the growth of the crop whereby the wheels run in the unimpeded furrows.—R.H.F.

1844 MIYASAKA, S. and others. Problemas sobre rotação soja × algodão. [Problems of the soyabean/cotton rotation.] *Bragantia* 1960, 19, Note 13, 57—62, bibl. 3, English summary. [Esta Exp. Ribeirão Preto, São Paulo, Brazil]

In a long-term rotation trial maize/cotton/soyabean, cotton yields were lower than when cotton was grown continuously. Also, the results from foliar diagnosis showed that cotton plants grown in rotation had lower contents of P and K than those in plots under continuous cropping. To explain these results 3 hypotheses are advanced: (1) the soil nutrients available for cotton grown in rotation are less than for cotton grown continuously because the crops grown in rotation with cotton remove more nutrients than cotton; (2) nematode attack is increased by growing soyabean; (3) a soyabean crop leaves a substance in the soil which is detrimental to cotton. F. s.—E.B.O.

1845 HASTIE, M. S. Spacing trials with cotton. *Progr. Repts Exp. Stas. Emp. Cott. Gr. Corp., Kenya* 1959—60 1961, 4—5.

A trial was carried out (at 4 sites) in which single or pairs of plants were spaced at from 9 to 24 in. apart in rows 3 ft apart. At 1 site only, Homa Bay, where a spacing of 2 plants at 24 in. in the row (the local practice) gave the highest yield, was any significant difference in yield found.—R.H.F.

1846 IZMAILOV, F. F. [Density of stand and yields of cotton.] [Russian] *Hlopkovodstvo* (Cott. Prod.) 1961, 11, No. 5, 9-16. [Uzbek SSR]

1847 BIRD, L. S. and EGGLE, D. R. Seedling growth differences of several cotton varieties and the influence of gibberellin. *Agron. J.* 1961, 53, No. 3, 171-2, bibl. 7. [Texas Agric. Exp. Sta., College Station]

Seed of 12 varieties of cotton was acid-delinted and treated with GA at 0, 1 and 10 g/100 lb seed prior to sowing in a 50 : 50 clay : sand medium. After 4 days, the average emergence for the above rates of GA was 3.6, 13.2 and 14.8% but from the 6th day onward there was no significant difference. Percentage emergence at 4 days for untreated seedlings and seedling height, were significantly correlated ($r = +0.72$). Varieties differed in their response to GA.—R.H.F.

1848 HACSKEYLO, J. and RANNEY, C. D. Emergence of phorate-treated cotton seed as affected by substrate moisture and temperature. *J. econ. Ent.* 1961, 54, No. 2, 296-8, bibl. 6. [Texas Agric. Exp. Sta., College Station]

Acid-delinted Deltapine-15 cotton seed from 2 commercial sources, treated with 4 lb phorate/100 lb seed and not treated, was tested under several conditions of soil moisture and temperature. The germination of phorate-treated seed from one source was slightly inferior to the non-treated but larger reductions in germination were due to high soil moisture (75% field capacity) and temperatures below 72°F. Seed from the other source was not affected by phorate, and germination was delayed but not reduced by lower temperatures. It was concluded that seed quality in addition to soil moisture and temperature could outweigh the depressing effect of phorate on germination.—R.H.F.

1849 KABAEV, V. E. [Irrigation of cotton on the basis of rapid methods for determining soil moisture.] [Russian] *Hlopkovodstvo* (Cott. Prod.) 1961, 11, No. 6, 42-50.

1850 WHITE, J. H. Gravity irrigation on cotton and soybeans in central Arkansas : an economic evaluation. *Rep. Ser.* 98 *Ark. agric. Exp. Sta.* 1961, pp. 22, bibl. 4, illus.

1851 TINCKNELL, R. C. and others. La posibilidad de diagnosticar deficiencias de nitrógeno y potasio en cultivos de algodón mediante el análisis foliar. [The possibility of diagnosing N- and K-deficiencies in cotton crops by foliar analysis.] *Agron. trop., Maracay* 1960, 9, No. 4, 121-6, bibl. 8, English summary. [Cojedes and Portuguesa States, W. Llanos, Venezuela]

Cotton is a relatively new crop in Cojedes and Portuguesa States where N- and K-deficiencies are widespread. It was found that the N content of the leaf-blades is closely related to the N status of the plant. In those regions, cotton crops showed symptoms of N deficiency when the N content of the leaf was less than 4.5%. This level did not depend on the age of the plants. The crops showed symptoms of K deficiency when the K content of the leaf-blades was less than 0.9%. It is concluded that leaf analysis can be a useful guide to the N- and K-status of cotton in the area studied. F. s.—E.B.O.

1852 INSTITUT DE RECHERCHES DU COTON ET DES TEXTILES EXOTIQUES. Activité de l'IRCT en République Malgache 1959. [The work of IRCT in the Republic of Madagascar during 1959. Cotton.] *Cot. et Fibr. trop.* 1960, 15, No. 3, 419-55, illus.

In varietal trials at Ankazoabo, where cotton is grown without irrigation, Stoneville 2 B yielded 2811 kg seed-cotton/ha (37.5% return at ginning) and is recommended for cultivation. In trials under irrigation in Tuléar region and at Mangoky Station, the yields (average of 3 years) of the best varieties were, in percentages of the yield of Acala 4-42 : Stoneville 123%, Coker Staple strain 127%, Deltapine B 35 124%, Acala 5675 110%, Acala 1517 C 112%. The quality of Stoneville fibre is, however, lower than that of Acala 4-42, and the tensile strength of Deltapine fibre is low.—E.B.O.

1853 WALTON, P. D. Cotton variety trials in the Northern and Eastern Provinces of Uganda, 1957-60. *Emp. Cott. Gr. Rev.* 1961, 38, No. 2, 81-91, bibl. 4.

Yield data from 60 trials conducted at 20 different sites during 1957-60 provide information on behaviour of cotton varieties in the N. and E. Provinces of Uganda. The type BP52 outyielded the locally grown, but contaminated, S47 by 12% (mean of 3 years' clean lint/ac) and had a superior lint quality. It is recommended that seed of strains of BP52 not fully susceptible to bacterial wilt be issued throughout the Provinces mentioned.—R.H.F.

1854 CARVALHO, M. de. Experimentação algodoeira. Resultados de alguns ensaios. [Results from some trials with cotton.] *Rev. Biol.* 1958, 1, No. 3-4, 209-60. [Centro Invest. Cie. Algodoeira, Mozambique] [Received July, 1961]

The results are given from trials with cotton at various experimental stations in Mozambique. A 455 and A 618 were best in varietal trials and are recommended for cultivation. Other trials were concerned with date and method of sowing, spacing and thinning the crop.—E.B.O.

1855 IYENGAR, N. K. **Improvement of Sea Island cotton variety 'Andrews'.** *Indian Cott. Gr. Rev.* 1960, 14, No. 4, 296-313, bibl. 3.

The variety Andrews grown in Kerala and Mysore States was superior to Montserrat in yield, ginning percentage and earliness. It matured earlier in coastal than in inland areas, and in the latter the plants were larger in several morphological respects. The crops grown in coastal areas had longer and finer fibres. F. s.—D.B.

1856 WADDLE, B. A. **Registration of improved cotton varieties.** *Agron. J.* 1960, 52, No. 11, 658. [Arkansas Agric. Exp. Sta.]

The varieties of the Upland types (*Gossypium hirsutum*) described are : Dixie King and Austin.—R.H.F.

1857 ANTHONY, K. R. M. and OGBORN, J. E. A. **[Cultivation practices for cotton.]** *Progr. Repts Exp. Stas Emp. Cott. Gr. Corp., Aden Protect., 1959-60* 1961, 10. [Res. Sta. El Kod]

The results of a field experiment indicated that 5 weeks' delay in hand-weeding an unthinned stand (5.2 plants/hill) reduced the yield of seed cotton from 1228 to 749 lb/ac.—R.H.F.

1858 RANNEY, C. D. **Cotton. Seedling disease and wilt studies.** *Miss. Fm Res.* 1961, 24, No. 3, 2-3. [Mississippi Agric. Exp. Sta., Stoneville]

During 1960, tests conducted at Yasco City, Stoneville and Tunica showed that good control of cotton seedling diseases, due to *Rhizoctonia solani*, *Glomerella gossypii*, *Fusarium* and *Pythium* could be obtained by agitating a mixture of (a) 10% captan + 10% PCNB, (b) 5% dichlone + 15% PCNB or (c) 8.67% captan + 5% PCNB + 7.5% zineb, at the rates of 2.4 or 3.0 lb/ac, with the seed (already dressed with ceresan M) prior to sowing. It is recommended that, when the above fungicides are used, seed be sown no deeper than 1 in., the fungicide be mixed thoroughly and in the correct amount, and that seed delinted mechanically, not by acid, be used. In studies at various sites in 1959 and '60 it was concluded that the most economical control of *Fusarium* wilt was obtained by using resistant varieties, e.g. Auburn 56, and that in this disease, which is a fungus/nematode complex, spot treatment of badly infected areas with a nematocide is efficacious.—R.H.F.

1859 BROOK, T. S. **Yields increased by thrips control in station tests.** *Miss. Fm Res.* 1961, 24, No. 5, 1 and 5. [Mississippi Agric. Exp. Sta., State College]

In 1957-9 the treatments (a) dieldrin sprayed in May at 0.5 lb/ac and (b) thimet at 0.5-1.0 lb/ac as a seed dressing were applied to cotton. All plots, including the control, were sprayed against

boll weevil [*Anthonomus grandis*] later in the season. The following results, with significant increases in yield over the control, were obtained (average for 3 yr in lb seed cotton/ac); dieldrin, 2531; thimet, 2445; control, 2244. Data are also given on the effect of these treatments on the progress of flowering and harvesting from the 1st to 7th week of flowering.—R.H.F.

1860 PFRIMMER, T. R. and others. **Field experiments with several insecticidal sprays against the boll weevil and bollworm.** *J. econ. Ent.* 1960, 53, No. 5, 711-14.

In experiments on cotton at Stoneville, Mississippi, in 1957 and '58 excellent control of *Anthonomus grandis* was obtained from 6 gal/ac of a mixture of guthion and DDT containing 0.25 and 0.5 or 1.0 lb a.i./ac, respectively, sprayed 7 times at intervals of 3-10 days. This mixture had a greater residual effect than had several others used.—R.H.F.

1861 COWAN, C. B., Jr and others. **Field experiments against several late-season cotton insects in 1959.** *J. econ. Ent.* 1960, 53, No. 5, 747-9, bibl. 4.

The results are given of a series of field experiments carried out in 1959 in the Waco district of Texas. Strobane and toxaphene, as dusts or sprays (+ DDT) were equally effective in controlling *Anthonomus grandis* and *Heliothis zea* and resulted in a 60% increase in seed-cotton yield. In another experiment, guthion + DDT gave better control of *A. grandis* than did SD 3562 + DDT and SD 4402, but was not superior to SD 5539 + DDT; all of them, except SD 3562, controlled *H. zea*.—R.H.F.

1862 PARENIA, C. R., Jr and others. **Control of several early-season cotton pests with insecticides.** *J. econ. Ent.* 1960, 53, No. 6, 1051-4, bibl. 4. [Texas Agric. Exp. Sta., College Station]

In a series of experiments on cotton carried out in 1959, toxaphene + DDT (at 1.5 + 0.75), guthion (at 0.25) and methyl parathion (at 0.5) gave better control of *Anthonomus grandis* and cotton flea hopper (*Psallus seriatus*) than dieldrin (at 0.25 lb a.i./ac) or toxaphene alone. Thrips (*Frankliniella*) was readily controlled by the above (except for guthion which was not tested) and by several other insecticides.—R.H.F.

1863 PROCTOR, J. H. **Control of *Diparopsis* in cotton.** *Progr. Repts Exp. Stas. Emp. Cott. Gr. Corp., Aden Protect., 1959-60* 1961, 17-18 and 25-7. [Res. Sta. Giar]

Spraying cotton with endrin 0.1% emulsion at weekly periods from 1st bud for the control of *Diparopsis watersi* increased the mean yield in a factorial experiment from 3667 to 4071 lb/ac as

compared with no spraying. A highly significant and positive interaction between spraying and N fertilizing and spraying and P fertilizing [rates not stated] was obtained. In another experiment, spraying as above from 1st bud to the end of March gave double the yield of non-sprayed plots or those sprayed from mid-Jan. to end-March, whilst spraying from 1st bud to mid-Jan. [early harvesting] gave an intermediate yield.—R.H.F.

1864 CHOYCE, M. A. and REED, W. **Insecticide trial at Samaru.** *Progr. Repts Exp. Stas Emp. Cott. Gr. Corp., N. Nigeria, 1959-60* 1961, 16-17.

γ -BHC at 0.25 lb, endrin at 0.25 lb, DDT at 1 lb, and DDT at 1 lb + γ -BHC at 0.06, 0.12 and 0.25 lb in 20 gal water were sprayed 4-9 times at weekly intervals from 14 Sept. on the cotton variety 26J sown 16 June. All treatments gave an increased yield over the control (606 lb seed cotton/ac) of from 21% (BHC alone) to 57% (endrin). Six applications of DDT + γ -BHC at 0.06 or 0.12 gave the cheapest formulation for satisfactory control of bollworms.—R.H.F.

1865 TUTTLE, D. M. and others. **The cotton leaf perforator [*Bucculatrix thurberiella*] and its control in Arizona.** *J. econ. Ent.* 1961, 54, No. 1, 67-70, bibl. 3. [Univ. Arizona, Agric. Exp. Sta.]

In tests carried out in the Yuma and Salt River areas from 1955 to '9 the following insecticides (with rates of toxicant in lb/ac) were found to control *Bucculatrix thurberiella*: methyl parathion, 0.5; toxaphene + DDT, 2.0 + 1.0; dilan, 1.25; malathion + DDT, 1.2 + 2.5; strobane + DDT, 4.6 + 2.3; dimethoate, 1.0; SD 4402, 1.0; sevin, 1.87; dibrom + DDT, 1.0 + 1.0; dipterex + DDT, 1.0 + 1.0; trithion + DDT, 1.0 + 0.25; chlorthion, 0.6; methyl parathion + endrin, 0.4 + 0.4. At Yuma in 1955 spray applications were better than dusts. Dilan is 1 part of 1,1-bis (p-chlorophenyl)-2-nitropropane plus 2 parts of 1,1-bis (p-chlorophenyl)-2-nitrobutane, strobane consists of terpenes chlorinated to 66% chlorine content, and dibrom is 1,2-dibromo-2,2-dichloroethyl dimethyl phosphate.—R.H.F.

1866 SRIVASTAVA, B. K. and BHATNAGAR, S. P. **Insects injurious to cotton crop in Rajasthan and suggestions for control of the major pests.** *Indian Agric.* 1960, 4, No. 1, 54-8, bibl. 5. [Rajasthan Coll., Udaipure]

1867 RONEY, J. N. and WENE, G. **Cotton insect control in Arizona, 1960.** *Bull. A-2 Univ. Ariz. agric. Exp. Sta.* 1960, pp. 19, illus.

1868 NATIONAL COTTON COUNCIL [OF AMERICA]. **Official 1961 cotton pest control guides.** 1961, pp. 28, Memphis: National Cotton Council.

1869 MUNRO, J. M. **Treatment of cotton planting seed.** *News Lett. Minist. Agric. N. Reg. Nigeria* 1961, No. 31, 10-12.

From trials carried out in 1955-8 at various localities in N. Nigeria it is concluded that treating cotton seed with either agrosan 5W (1 part with 160 parts by weight of seed) or acid, will control *Xanthomonas malvacearum* to the extent of increasing the yield of seed cotton by 30-40 lb/ac. Thus a gross return of 15 s/ac may be obtained from an outlay of 1s/ac on seed treatment.—R.H.F.

1870 MAKSIMENKO, I. K. and KURBANGEL'DYEV, S. [Structure of the cotton bush and yields.] [Russian] *Hlopkovodstvo (Cott. Prod.)* 1961, 11, No. 5, 26-30, illus. [Turkmenian Agric. Inst.]

1871 KONSTANTINOV, N. N. **The effect of photoperiod on the branching, flower-bud formation and flowering of cotton.** [Russian] *Bot. Zh., SSSR (Bot. J., USSR)* 1961, 46, No. 5, 628-33, bibl. 24, English summary. [Bot. Gdn, Acad. Sci. USSR, Moscow]

1872 MEGIE, C. **Cycle de floraison et productivité du cotonnier.** [Flowering cycle and productivity of cotton.] *Cot. et Fibr. trop.* 1960, 15, No. 3, 388-90, bibl. 1, English summary. [Sta. IRCT, Tikem, Chad]

In a trial in 1958, cotton was sown on 20 June and treated 4 times with endrin for pest control, the first time when the first flower appeared in the field (50 days after sowing) and then at intervals of 10-15 days. All the bolls had opened by mid-Nov. The yield [of seed cotton] was 4.6 tons/ha, which was obtained with a density of 45 thousand plants (average height 147 cm) per ha. These early treatments resulted in no bolls being formed after the first ones, which gave an early and abundant crop. Without treatment, the plants continued producing bolls which were destroyed by pests as they were formed, and yields were low and spread over a long period (Oct.-Jan.). On poor soils, plant density can be increased to 80 thousand plants/ha.—E.B.O.

1873 RYŽOV, S. N. and AGAPOVA, M. I. [The water regime and development of cotton under different concentrations of the nutrient solution.] [Russian] *Vestn. S-H. Nauki (J. agric. Sci. USSR)* 1961, 6, No. 5, 22-8, bibl. 22, English, German and French summaries.

1874 TAGI-ZADE. **The effect of micro-elements [B, Mn, Zn and Cu] on the intensity of photosynthesis and carbon and protein metabolism in cotton.** *Uch. Zap. Azerb. Univ.* 1957, 5, 47-61. [Abstract 38465 in *Biol. Abstr (D)* 1961, 36, No. 12.]

1875 GUSEINOV, A. A. [Petroleum growth stimulators in the production of cotton.] [Russian] *Hlopkovodstvo* (Cott. Prod.) 1961, 11, No. 5, 17-19. [Inst. of Soils and Agrochem., Acad. Sci. Azerbaïdžan SSR]

By moistening cotton seed in weak solutions (0.05-0.005%) of petroleum growth-stimulators, stem growth and number of bolls on the plants were increased. Yields of cotton in 2 experiments were increased from 230 to 310 kg/ha compared with the controls in which the seed was moistened with water. Spraying the plants at the flower-bud stage with the petroleum solution also increased yields of cotton from 380 to 440 kg/ha. Similar beneficial effects were obtained if the petroleum solution was given to the crop with mineral fertilizers.—M.H.

1876 INSTITUT DE RECHERCHES DU COTON ET DES TEXTILES EXOTIQUES. *Activité de l'IRCT 1958. Le coton. [The work of IRCT during 1958. Cotton.]* *Cot. et Fibr. trop.* 1960, 15, No. 2, 163-365, illus.

République Centrafricaine. Bambari Station : The yield of the variety D9 averaged 1233 kg seed-cotton/ha, the maximum being 2030 kg. It was confirmed that bush fires and cassava grown on the fallow have a depressing effect on paddy grown after cotton and 2 years' fallow. Investigations are in progress to find a cover crop better than *Pennisetum purpureum* and to determine the optimal duration of the fallow. Burning *P. purpureum* grown on the fallow, before tillage, facilitates soil cultivation, limits the number of weedings and does not affect cotton yields. Bossangoa Station : in regional trials the variety Allen 150 K yielded best in most places ; the variety Soumbé A 25 B 9, which is resistant to *Lygus* and black-arm (*Xanthomonas malvacearum*), will be grown in Bouca district. Chad, Bebedjia Station : the variety Allen-150 is grown on the whole area supervised by the Station. République du Congo, Madingou Station : the crop rotation under trial is cotton/groundnuts, groundnuts/meadow grazed for 3 years. Nord-Cameroun, Section d'Expérimentation Cotonnière: the average yield of seed-cotton, about 450 kg/ha, was the highest ever recorded in the region, the variety grown being A.151 ; from trials on (a) earthing up after thinning cotton sown on the flat, and (b) sowing on ridges, it was concluded that both earthing up and sowing on ridges are beneficial ; the practice of earthing up is recommended for the whole cotton area of N. Cameroun where it would increase yields by at least 10% ; sowing on ridges is a costly operation and is recommended only for regions which have a high rainfall at sowing-time. Ivory Coast, Bouaké Station : Allen varieties yielded best ; in spacing trials, the highest densities gave the highest yields (835 kg/ha from 1.25 x 0.50 m) ; this is attributed

to the low rainfall which limited the development of cotton plants. Morocco, Tadla Station : the varieties Ashmouni A 20 and Tadla 1, gave the highest yields of lint/ha. Algeria, Section Textile de Perregaux : cotton in this area should be sown from late March to mid-April in pockets 20 cm apart along ridges 1 m apart ; the plants should be thinned 1 month after sowing, leaving 2 plants per pocket ; the crop should be weeded early and irrigated every 3 weeks until 15 June, then every 2 weeks until 30 July, every 10 days in Aug., and again on 15 Sept. if no rain has fallen.—E.B.O.

1877 MISSISSIPPI AGRICULTURAL EXPERIMENT STATION. [Cotton.] *Rep. Miss. agric. Exp. Sta.* 1958-9 [n.d.], 72, 14-15, 16, 52-3, 56-62, 69, 73, 74.

In 1958, cotton plots dependent on rainfall produced 3445 lb seed cotton/ac while plots irrigated when soil at 15-in. depth reached 0.3 atm moisture tension yielded 4005 lb/ac. Plots irrigated at 0.7 atm moisture tension did not yield significantly more than the rainfall plots. Applications of solutions of ammonium nitrate, urea and mixtures of these, giving a total of 30 lb N/ac, to cotton leaves were compared with an equal amount of ammonium nitrate applied as a side dressing. The urea solution was more effective than the side-dressed ammonium nitrate or the other N solutions, which damaged the leaves. At the Brown Loam Branch Station, Auburn 56 was the leading cotton variety over a 4-year period in a test of 16 varieties. In tests over 7 years at the Coastal Plain Branch Station there was no difference in value per ac of the varieties Plains and Coker Wilt. Empire ranked third, followed closely by Fox and Delfos 9169. A preceding crop of vetch was equivalent to an application of 90 lb N/ac for cotton production. At the Delta Branch Station, the early cotton varieties Fox 4, Stoneville 3202, Delfos 9169 and Stardel all produced over 745 lb lint/ac. Skip-row sowing with 4 rows sown and 4 rows fallowed gave yield increases of 73, 25 and 40% over solid-sown cotton in 1956, 1957 and 1958, respectively. Corresponding increases for plots with 2 rows sown and 2 rows fallow were 127, 45 and 60%. In a defoliation and time of mechanical harvesting study in 1958, grade of cotton was improved by defoliation. Fibre quality was not affected by application of a defoliant when at least 50% of the bolls were open. In an 18-day period before frost, relative humidities averaged 8.8% lower in defoliated than in undefoliated plots. In field-plot experiments, sevin as a 10 or 20% dust gave effective control of boll weevils, guthion, malathion, methyl parathion and toxaphene/DDT also effectively controlled boll weevils. Defoliation at the 50-60% open-bolls stage facilitated machine-harvest operations. In tests of commercial defoliants, calcium cyanamide dust applied in late

afternoon to dry foliage in anticipation of dew was most effective on very rank growth where adequate spray coverage was difficult. Combinations of ATA with half rates of chlorate or phosphate defoliant were satisfactory for mid-season application to upright, moderately mature plants where second growth was expected. Chlorate or phosphate alone was more effective for Oct. applications when second growth was not expected. Splitting of unopened bolls was accelerated by Chipman FB₂ and, to a lesser extent, by pentachlorophenol. First-year results indicated that the shielded type of cultivation in cotton treated with herbicides was advantageous over "dirt" cultivation only where it was necessary to maintain a flat area for post-emergence applications of herbicide or flame. Early injury from pre-emergence applications of CIPC caused stand reductions of up to 24% but did not reduce yield. Plots treated pre-emergence with diuron outyielded untreated plots in 40 out of 54 instances. Geigy 30031 was superior to CDT and Geigy 30044 as a post-emergence herbicide for young cotton. Geigy 30027, Geigy 31435, diuron and granular NPA gave acceptable results as late-season or lay-by herbicides, but were not greatly superior to pre-emergence treatment plus hoeing and dirt cultivation. Isolated clumps of grassy and broad-leaved weeds decreased the yield of enclosed and adjacent hills of cotton if not removed before the square stage of cotton growth. No yield loss occurred if the clumps were removed when the cotton was 6 in. tall. In variety tests at the North Mississippi Branch Station, Stoneville 7 yielded most (948 lb lint/ac), followed by DES 1000 (898 lb/ac). At the Pontotoc Ridge-Flatwoods Branch Station, satisfactory varieties were: (early), Dixie King, Auburn 56 and Empire; (late), Stoneville 7, Coker Wilt and Delta Pine SL. Sowing every other 4 rows with cotton and fallowing the unsown rows gave a 22% yield increase over solid sowing.—A.M.H.

1878 KAMALANATHAN, S. and NAGARAJAN, C.
Economics of cotton cultivation in the
Madras State. *Madras agric. J.* 1961, 48, No. 4,
125-33.

FIBRE FLAX

1879 FRANSSEN, C. J. H. and MANTEL, W. P.
De door tripsen veroorzaakte beschadigingen
in het vlasgewas en het voorkómen daarvan.
[Damage to flax crops caused by thrips, and
its prevention.] *Tidschr. PlZiekt.* 1961, 67, No. 2,
39-51, bibl. 10, illus., English summary. [Inst.
PlZiektenk. Onderz., Wageningen, Netherlands]

The life histories of the flax pests *Thrips angusticeps* and *T. linarius* are described. *T. angusticeps* also attacks peas, barley and wheat,

while *T. linarius*, which is the rarer insect and almost confined to the southern Netherlands, appears to attack flax alone. Recommendations for control are: (a) crop rotations of red clover/oats/flax, potatoes/oats/flax or beet/oats/flax; (b) spraying with insecticides when the crop is 2 cm tall to control *T. angusticeps* and again in mid-May to control both species. Best control has been achieved with parathion at 400 g a.i./ha and with a mixture of 1 l 20% dieldrin and 1 l 20% parathion/ha. Rogor and heptachlor are also effective.—R.B.

1880 JORDAN, L. S. and others. Effects of the
interaction of varying temperatures
and light intensities on the response of flax
to 2,4-D. *Tech. Bull. 237 Univ. Minn. agric. Exp.
Sta.* 1960, pp. 28, bibl. 27.

Pots containing 8 seedlings of Marine flax were sprayed at 14 or 16 days with 2,4-D triethanolamine salt in 1100 ppm. aqueous solution at a rate equivalent to 6 oz [2,4-D a.i.]/ac. The major variables to which the plants were exposed both before and after spraying were: day temperatures of 65°, 75° and 85°F (with night temperature constant at 65°F) and light intensities (at 2.5 in. above the plant base) of 200, 500, 800 and 1100 f.c. At the end of a 28-day test period plants were cut at soil level in order to measure response in terms of reduction in height, length of internode and dry weight. There were 3 phases of treatment: (1) similar day temperatures and light intensity, before and after spraying; (2) 14 days with pre-spraying conditions differing from post-spraying period; (3) various durations of differing conditions in a 16-day pre-spraying period followed by constant conditions for 12 days. The conclusions were that: (a) the response was greater the higher the temperature both before and after spraying; (b) the response was greater the lower the light intensity both before and after spraying; (c) there was a marked interaction in which the temperature effect was reduced the higher the light intensity.—R.H.F.

JUTE

1881 SIRCAR, S. M. and CHAKRAVERTY, R.
The effect of gibberellic acid on jute
(*Corchorus capsularis* Linn.). *Sci. and Cult.* 1960,
26, No. 3, 141-3, bibl. 4, illus. [Dept Bot., Univ.
Coll. Sci., Calcutta-19]

GA at 1000, 100 and 10 ppm. was applied to the youngest leaf of jute plants. One week later the treated plants (when compared with controls) showed increased height and basal circumference and a greater number of nodes and leaves; leaf fall was earlier. The concentration of 10 ppm. proved to be the best for fibre-extraction values.—D.B.

KENAF

1882 CIARAMELLO, D. Cultura do kenaf. [Cultivation of kenaf (*Hibiscus cannabinus* in Brazil).] *Agrônomo, Campinas* 1960, 12, No. 1-2, 15-18. [Inst. Agron. Campinas, Brazil]

1883 VAN HEURN, E. W. Kenaf-growing in Thailand. *World Crops* 1961, 13, No. 6, 225-6, illus.

1884 INSTITUT DE RECHERCHES DU COTON ET DES TEXTILES EXOTIQUES. Activité de l'IRCT 1958. Les succédanés du jute. [The work of IRCT during 1958. Jute substitutes.] *Cot. et Fibr. trop.* 1960, 15, No. 2, 340-4, illus. [Cotton Station of Tadla, Morocco]

In a sowing-date trial *Hibiscus cannabinus* var. Deroua red was sown on 6 dates from 14 March to 9 May. Sowing on 3 and 19 April gave the highest fibre yields, 4180 and 4069 kg (4.17% and 5.94% fibre in the green matter), respectively. Observations on growth and flowering with different sowing dates are reported. From an irrigation trial it was concluded that *H. cannabinus* requires a maximum of 7000 m³ water/ha from May to Sept.—E.B.O.

1885 WALKER, J. E. and others. Some relationships between dates of planting, flowering and harvest date, expected yields of seed and fiber from kenaf, *Hibiscus cannabinus*, in Cuba. *Turrialba* 1960, 10, No. 4, 149-55, bibl. 1, Spanish summary. [Esta. Exp. Agron., Santiago de las Vegas, Cuba]

Trials were carried out at Santiago de las Vegas (23°N. lat.) to study the influence of day length on leaf formation, flowering and fruiting of 2 kenaf varieties, *viridis* and *vulgaris*, which were sown at weekly intervals over 3 years. In another series of trials the plants were subjected to artificially shortened days. Results showed that : (a) the seedlings emerged 4-5 days after sowing ; (b) the first true leaves appeared 15-24 days after sowing ; (c) the flower buds appeared at a given number of days after day length had been reduced to a critical number of hours ; (d) the interval between a visible flower bud and the open flower was 20-28 days. A table gives the intervals in days between each sowing date tested and dates on which specified stages of development were reached (3-year averages).—E.B.O.

1886 TOOLE, E. H. and others. Plastic bags for shipping seeds in the tropics. *Proc. internat. Seed Test. Ass.* 1961, 26, No. 1, 86-8. [U.S. Dept Agric. Res. Serv., Beltsville, Md]

Limited trials with kenaf (*Hibiscus cannabinus*) seed indicate that polyethylene bags of 10-mm thickness are suitable for shipment and short-

time storage of seed, but are not sufficiently moisture-resistant to protect seed for more than a few months under humid conditions.—G.M.R.

OIL CROPS

OIL-SEED FLAX

1887 MARTIN, A. L. D. and others. Aster yellows resistance in flax. *Canad. J. Pl. Sci.* 1961, 41, No. 2, 316-19, bibl. 4, illus. [Canada Dept Agric., Winnipeg, Manitoba]

A selected strain of the [oil-seed] flax variety Abyssinian (C.I. 302) has shown a high degree of field resistance to aster yellows virus.—R.B.

SUNFLOWER

1888 SEMIHNENKO, P. G. and BELEVCEV, D. N. [Dates for sunflower thinning in areas where downy mildew is prevalent.] [Russian] *Vestn. S-H. Nauki (J. agric. Sci. USSR)* 1961, 6, No. 6, 30-6, bibl. 5, illus., English, German and French summaries.

1889 VINOT, G. La récolte du tournesol. [Harvesting sunflower (in France).] *Oléagineux* 1961, 16, No. 7, 441-3, illus.

1890 SCOTT, E. G. Effect of supra-optimal boron levels on respiration and carbohydrate metabolism of *Helianthus annuus*. *Pl. Physiol.* 1960, 35, No. 5, 653-61, bibl. 30. [Univ. Calif., Davis]

Sunflower plants, after 1 week of sand culture as seedlings, were grown in nutrient solutions to which B in either normal (0.5 ppm.) or excessive (50 ppm.) quantities, was added 4 days prior to harvesting, the plants then being 30 days old. The high-B treatment resulted in a higher respiration rate, a higher concentration of sugar and a lower concentration of starch. The partial function of B in plants is suggested as being the inhibition of sugar-polymerization at the site of synthesis.—R.H.F.

RAPE

1891† GRIFFITH, G. AP and JOHNSTON, T. D. The nitrate-nitrogen content of herbage. 3. The mineral nitrate content of rape and kale. *J. Sci. Fd Agric.* 1961, 12, No. 4, 348-52, bibl. 4.

The high nitrate-nitrogen content found in some herbage samples persisted to maturity, although it varied considerably in different portions of the same plant. Nitrate-N was closely related to the level of N application and to the

crude-protein content of the plant. About 18% of crude protein was accompanied by what may be a nutritionally unacceptable amount of nitrate-N. The level of fertilizer N at which this point was reached coincided with that at which dry-matter yield response ceased. F. s.—C.L.S.

1892 VANTERPOOL, T. C. and DOSMAN, E. J. **Germination of rape seed after burial in soil of subgermination moisture content.** *Canad. Pl. Dis. Survey* 1961, 41, No. 3, 161-4, bibl. 1. [Univ. Saskatchewan, Saskatoon]

Placing seeds of Argentine and Polish rape [*Brassica napus* var. *oleifera* subvar. *annua* and *B. campestris* var. *oleifera* subvar. *annua*, respectively] in soil moistened with 8% by weight of water had no significant adverse effect on their subsequent germination in moist soil. The effects of seed dressing on germination were inconsistent.—R.B.

1893 JOURDHEUIL, P. and JOURNET, P. **Mise au point de méthodes d'avertissement pour lutter contre les ravageurs du colza.** [Warning systems for the control of pests of rape.] *Oléagineux* 1961, 16, No. 5, 303-6, bibl. 14. [Inst. Nat. Rech. Agron. Versailles, France]

Information is given on warning systems which are being developed in France in connection with measures for controlling pests of rape (mainly *Psylliodes chrysocephala*, *Ceuthorrhynchus* spp. and *Meligethes* sp.).—E.B.O.

1894 JOURDHEUIL, P. **Recherches récentes sur le charançon de la tige du colza (*Ceuthorrhynchus napi* Gyll.).** [Recent investigations on the rape stem weevil (*C. napi*).] *Oléagineux* 1961, 16, No. 6, 389-95, bibl. 36. [Inst. Nat. Rech. Agron., Versailles, France]

This article includes a review of methods for controlling *Ceuthorrhynchus napi*, a pest of rape and other *Brassica* spp. [See also previous abstract.].—E.B.O.

1895 DURAND, Y. **La récolte du colza.** [The harvest of rape (in France).] *Oléagineux* 1961, 16, No. 7, 469-71, illus.

POPPY

1896 DUMONT, G. **La récolte de l'œillette.** [The poppy harvest.] *Oléagineux* 1961, 16, No. 6, 365-8, illus.

In France the growing of poppy has been encouraged during the past few years for the production of seed (used in cookery and bird-feeding), oil and opium. Poppy is considered an excellent crop when grown at the beginning of a rotation, before wheat. Both in France and elsewhere work has been carried out to mechanize cultural methods and harvesting. Poppy should

be harvested when the seeds are mature. This article gives information mainly on harvesting and cleaning the seeds and capsules.—E.B.O.

OTHER

1897† BERGGREN, G. **Beskrivning av vissa odlade och vildväxande *Brassica* och *Sinapis*-arters frökaraktärer jämte en hjälpgrundad bestämningsnyckel.** [Seed characters of certain cultivated and wild *Brassica* and *Sinapis* species and a key for the determination of these species based on seed samples.] *Medd. Frökontrollanst., Stockh.* 1960, No. 35, 28-64, bibl. 8, illus., English summary.

MISCELLANEOUS CROPS

BUCKWHEAT

1898 ŠČEPETKOV, A. A. **Buckwheat-growing on the Kustanai chernozem soils** [Kazakhstan, USSR]. [Russian] *Vestn. S.-H. Nauki (J. agric. Sci. USSR)* 1961, 6, No. 5, 10-14, English, German and French summaries. [Kustanai State Agric. Exp. Sta.]

1899 RUSZKOWSKA, B. **O przyczynach złego owocowania i plonowania gryki.** [On the causes of bad fruiting and yield in buckwheat.] *Hod. Róslin. Aklimat. Nasien. (Pl. Breed. Acclim. Seed Prod.)* 1960, 4, No. 6, 713-20, bibl. 7, English summary. [Puławy, Poland]

Measures suggested for increasing the productivity of buckwheat [*Fagopyrum esculentum*] are: (1) the placing of beehives in the fields at the flowering stage; (2) the choice of varieties characterized by vigorous growth, good tillering and flowering; (3) sowing on two dates in the 2nd and 3rd decades of May, at a spacing of 40 cm and a seed rate of 50 kg/ha; (4) research on the influence of heterosis; and (5) breeding for self-pollination. F. Eng. s.—G.M.R.

1900 ELAGIN, I. N. **Measures for improving seed production of buckwheat.** [Russian] *Selekt. Semenovod. (Select. Seed Prod.)* 1961, 26, No. 2, 25-9.

KALE

See also Abs. 1891.

1901† PRYTHERCH, E. I. and TOULSON, G. A. **Application of herbicides in conjunction with precision drilling in kale, turnips and swedes.** *Proc. 5th Brit. Weed Contr. Conf.* 1960, 133-8, bibl. 2. [NAAS, Trawscoed, Aberystwyth]

A technique has been devised for low-cost growing of kale, turnips and swedes in which spraying with PCP at 2-4 lb/ac follows ridging,

and precision drilling of the crop is done soon afterwards. Preliminary trials with diquat have given promising results.—R.B.

CROP BOTANY

GERMINATION

1902 DE TEMPE, J. **Seed weakness.** *Proc. internat. Seed Test. Ass.* 1961, 26, No. 1, 3-11, bibl. 19.

The literature is reviewed, with special reference to the measurement of seed weakness (reduced resistance to adverse field-sowing conditions).—G.M.R.

1903† LEWIS, J. **The influence of water level, soil depth and type on the survival of crop and weed seeds.** *Proc. internat. Seed Test. Ass.* 1961, 26, No. 1, 68-85, bibl. 9. [Welsh Plant Breed. Sta., Aberystwyth]

The results of 3 experiments showed that *in situ* germination accounted for the rapid depletion of seed populations, and that some reduction might occur from fungal and bacterial attack. Water level had the greatest effect on survival: seeds placed below the water table for periods of up to 2 months remained dormant, and on recovery were capable of high germination. Seeds held at soil levels above a water table, and consequently under a high moisture status, germinated more readily than those at similar levels under free-drainage conditions. Soil type did not have a marked influence on seed survival under the conditions of the experiment, but it could influence species differently so that those adapted for acid conditions persisted better in peat than in river sand or loam soil. Seeds were preserved better under low temperatures. Seeds having hard coats, such as *Rumex crispus* and *Lychnis alba*, could persist under apparently adverse conditions, as would also the seeds of cereals and grasses which remained viable up to 2 months in a fully imbibed condition. These seeds were often capable of high germination, but because of unsuitable environmental conditions frequently remained dormant. It is concluded that the best means of [cultural] weed control is to provide conditions favourable to germination [of the soil reservoir of seed]. F. s.—G.M.R.

1904 KITTOCK, D. L. **The relationship of respiration and 2,3,5-triphenyl-2H-tetrazolium chloride reduction in germinating [wheat] seeds to seedling vigor.** *Diss. Abstr.* 1960, 21, No. 3, 413. [Washington State Univ., Pullman]

1905 MÁNDY, G. and PÁL, G. **Sóoldatok hatása a rozs, a zab és a napraforgó fajták csírázására.** [The effect of treatment with different salt solutions on seed germination in some varieties of rye, oats, and sunflower.] *Növénytermelés* 1960, 9, No. 4, 343-58, bibl. 12, English summary. [Agric. Res. Inst., Iregszemcse, and Hung., Acad. Sci., Martonvásár]

Germination tests with 4 varieties of sunflowers, 5 of rye and 4 of oats showed significant specific and varietal differences in reaction to different concentrations of alkaline salts. Data obtained are compared with those produced for wheat in earlier, identical tests. The following are some of the conclusions. Dilute concentrations of NaCl (0.1 and 0.25%) stimulated only sunflower and wheat. The highest concentration of NaCl (3%) totally suppressed germination in sunflower, and greatly inhibited it in wheat and oats, while rye was relatively resistant to the same treatment. The decreasing order of the species studied in respect to salt tolerance was rye, oats, wheat, sunflower. Low concentrations of KNO₃ (0.1 and 0.25%) stimulated germination in sunflower. Varietal differences in reaction are recorded. In oats and sunflower increasing salt concentrations decreased the time required for germination to begin and increased the duration of germination. The opposite effect occurred in rye. F. Eng. s.—G.M.R.

1906 PÁLFI, G. **A termesztett növények csírázásának szikes közegben.** [Seed germination of crop plants in saline media.] *Növénytermelés* 1960, 9, No. 4, 359-68, bibl. 30, English summary. [Agric. Res. Inst., Szeged, Hungary]

Seed germination in wheat, maize, peas, fodder- and sugar-beet and rice was studied in saline media and compared with the germination of seeds soaked in water for 24 hr. It was found that 10% van 't Hoff solution lengthened the duration of germination while percentage germination was only slightly reduced. The greatest tolerance to the high salt concentration of the solution was shown by sugar-beet. Seeds were soaked for 24 hr in distilled water, tap water, and 10% van 't Hoff solution. Significant amounts of univalent cations (Na, K) were released into the ambient solution by the seeds of all the spp. studied. With the exception of sugar-beet, the

amount of univalent cations released increased in the following order : distilled water, tap water, and van 't Hoff solution. There was an uptake of Ca from tap water by each species studied, and a release of Ca into the van 't Hoff solution by each species except sugar-beet. The time required for the germination of wheat, maize, fodder-beet and rice was decreased by pre-soaking for 24 hr in non-saline water, but the same treatment was ineffective with sugar-beet. It is concluded that soaking seeds for 24 hr in non-saline water favours germination in a saline soil, and also that high salt content of soil is less unfavourable for germination when soil conditions are moist. F. Eng. s.—G.M.R.

MORPHOLOGY AND ANATOMY

1907† HALL, D. M. and JONES, R. L. **Physiological significance of surface wax on leaves.** *Nature, Lond.* 1961, **191**, No. 4783, 95–6, bibl. 3, illus.

This study was made with an electron microscope, using *Trifolium repens*. The authors suggest that when plant growth is interrupted by adverse conditions the surface wax of the leaves is removed by weathering and is not replaced sufficiently quickly, so that the plant is subjected to additional stress through having an unusually high cuticular leaf transpiration. This, it is claimed, is borne out by field observations. Evidence was also obtained which suggested that the presence of wax on leaf surfaces, and its form, are related to frost hardiness.—A.G.G.H.

1908 ČULANOVSKAJA, M. V. **The effect of light conditions on the anatomical structure of the leaf and its bearing on growth and development of the plant.** [Russian] *Bot. Ž., SSSR (Bot. J., USSR)* 1961, **46**, No. 3, 364–71, bibl. 12. [Agro-physics Sci. Res. Inst., Leningrad]

Studies with *Triticum vulgare* and *Phaseolus vulgaris* are reported.—M.H.

METABOLISM AND PLANT CHEMISTRY

1909 WHITEHEAD, E. J. **Metabolism of selenium and sulphur in plants [wheat].** Pp. 49. [Abstr. 12694 in *Nuclear Sci. Abstr.* 1961, **15**, No. 10]

1910† KULIKOV, N. V. **[The absorption of Co by plants in relation to the humus content of the soil.]** [Russian] *Počvovedenie (Pedology, Moscow)* 1961, No. 4, 78–81, bibl. 12, English summary. [Biol. Inst., Uralsk Filial Acad. Sci. USSR]

The study was made (2 replications) with *Avena sativa* and *Vicia sativa* grown in soil in which the humus content varied from 3.4 to 16.9% of soil

dry weight. An inverse relationship was found between Co accumulation by the plants and content of organic substance in the soil. Absorption of Co continued during the whole of the vegetative period. The distribution of ^{60}Co (in counts/min per 1 g dry substance of the plant parts at the end of the vegetative period) was as follows (average of all variants in soil-humus content) : oat ; seeds 4, leaves 40, stems 18, roots 2990 ; vetch ; seeds 110, valve of pod 124, leaves 140, stems 100, roots 2360.—M.H.

1911 DANILOVA, T. A. and DAVYDOVA, E. N. **[The effect of cobalt on plants.]** *Doklady Akad. Nauk SSSR (Proc. Acad. Sci., USSR)* 1961, **137**, No. 6, 1470–3. [All-Union Sci. Res. Inst. Fert. and Agropedology]

This work was concerned with laboratory and field experiments in which *Phaseolus*, *Panicum miliaceum* and *Sinapis juncea* were studied in regard to the effects of Co on yields and on the plants' metabolic processes.—M.H.

1912 BUŠUEVA, T. M. and others. **Forms of calcium compounds in plants at different levels of calcium nutrition.** [Russian] *Vestn. Leningradsk. Univ. (J. Leningrad Univ. Ser. Biol.)* 1961, **16**, No. 3, 24–35, bibl. 34, English summary.

These experiments were made with wheat and peas (or lupins).—M.H.

1913 NYE, P. H. and FOSTER, W. N. M. **The relative uptake of phosphorus by crops and natural fallow from different parts of their root zone.** *J. agric. Sci.* 1961, **56**, No. 3, 299–306, bibl. 6. [Univ. Coll. Ghana]

A tracer method was used to determine the relative amounts of P that some short-term crops derive from different parts of their root zone when growing on P-deficient latosol. The crops made little use of subsoil P. Millet (*Pennisetum typhoides*) derived 16% from below 12 in. after 95 days' growth ; maize derived 7% and pigeon pea (*Cajanus indicus*) 11% from below 10 in. after 80 days. Pigeon pea fed much closer to its base than did the cereals until the 50th day. Since millet absorbed little P from subsoil placed in a layer only 5–10 in. deep, it is concluded that the poor uptake of subsoil P is due to low availability, rather than a natural feeding habit. F. s.—E.B.O.

1914† KAZARJAN, V. O. **[The effect of temperature on the translocation of assimilates in the plant stem.]** [Russian] *Doklady Akad. Nauk Armjansk. SSR (Proc. Acad. Sci. Armenian SSR)* 1961, **32**, No. 2, 117–22, bibl. 12. [Bot. Inst., Acad. Sci. Armenian SSR]

Experiments were made with *Setaria glauca*, *Artemisia fragrans* and *Erigeron*. It is concluded that

the maximal rate of translocation of assimilates occurs at 35°C.—M.H.

1915 ČERNOMORSKIĬ, S. A. and MUHINA, V. A.

The state of chlorophyll in the leaves of plants in relation to their geographical origin. [Russian] *Bot. ž., SSSR (Bot. ž., USSR)* 1961, **46**, No. 5, 683–5, bibl. 7. [Komarov Bot. Inst., Acad. Sci., Leningrad]

Varieties of barley (Leningrad and Kuban origins) and of maize (Leningrad and Moldavian origins) were included in this study. The amount of chlorophyll extractable from the leaves by petroleum ether was used as an indicator of the state of the chlorophyll. A greater quantity of chlorophyll could be extracted from leaves of the Leningrad maize than from maize of southern origin, the amount being 15–19% greater during Aug. 1959, and 30–37% greater in Aug. 1960 (being affected by weather differences in the 2 years). Similar figures were obtained for barley.—M.H.

1916 PETROV, A. P. [The phasic mode of occurrence of water exosmosis from living tissues of the leaf.] [Russian] *Doklady Akad. Nauk SSSR (Proc. Acad. Sci. USSR)* 1961, **136**, No. 5, 1245–7, bibl. 9.

Maize was among the plants used in the experiments.—M.H.

1917 MITSUI, S. **The N.P.K. uptake and O₂ secretion in relation to the metabolic pathways within the plant roots [Rice].** *Proc. Japan Acad. Sci.* 1960, **36**, No. 10, 652–7, bibl. 16, illus. [Fac. Agric. Univ., Tokyo]

1918 PETERBURGSZKIĬ, A. V. and TARABRIN, G. A. **A növényi gyökerek hidrogén ion kiválasztása a tápanyagfelvétel során. [Hydrogen-ion excretion by plant roots during the process of mineral uptake.]** *Agrokémia és Talaj.* 1960, **9**, No. 4, 435–52, bibl. 50, illus., English summary. [Timirjazev Agric. Acad., Moscow]

The subject was studied in pot cultures of oats, rice and wheat using a divided root system in sand medium. The amount of H⁺ excreted was found to be proportional to the absorption capacity of the medium and independent of the weight of roots. F. Eng. s.—G.M.R.

1919 MEGURO, M. and FERRI, M. G. **Informações sobre a influência do N-fenil carbamato de isopropila no comportamento de algumas plantas, com especial consideração da transpiração. [Influence of IPC on the behaviour of some plants, with special regard to transpiration.]** *Rev. Biol.* 1960, **2**, No. 2, 75–94, bibl. 16, illus., English summary. [Dept Bot., Univ. São Paulo, Brazil]

In the trials described, the plants were grown in nutritive solutions to which IPC at different concentrations was added. IPC treatment on maize plants resulted in a reduction in the growth of roots, stems and leaves, and a small decrease in transpiration rates throughout the day. The concentration of 20 ppm. had the strongest effect.—E.B.O.

ENVIRONMENT

1920 LETEY, J. and BLANK, G. B. **Influence of environment on the vegetative growth of plants watered at various soil moisture suctions.** *Agron. J.* 1961, **53**, No. 3, 151–3, bibl. 11. [Univ. California, Los Angeles]

Various plants were grown in a semi-controlled environment chamber in soil maintained at several moisture contents (mostly at 0.5 and 5.0 atmospheres suction), and growth increments and water consumption were determined over a period of several weeks. It was concluded that (a) greater reduction in plant growth follows replenishment of soil moisture after a period of high suction under conditions of high rather than of low evapotranspiration, (b) more efficient use is made of moisture added at higher than at lower soil suctions irrespective of the temperature, (c) less water is lost by transpiration or evapotranspiration when applied at higher suctions.—R.H.F.

1921 LEACH, G. J. **Photosynthesis at different heights in crops.** *Rep. Rothamsted exp. Sta.* 1960 Harpenden, 1961, 97.

The use of a sugar-beet seedling grown in nutrient solution as a portable phytometer for determining photosynthetic activity is described. This technique was used to demonstrate in barley, kale and sugar-beet the possibility of photosynthesis at the bottom of the crop profile, late into the growing season.—R.H.F.

1922 DADYKIN, V. P. and BEDENKO, V. P. [The assimilation of radiant energy by plants in relation to environmental conditions.] [Russian] *Vestn. S-H. Nauki (J. agric. Sci. USSR)* 1961, **6**, No. 6, 13–19, bibl. 24, English, German and French summaries. [Karel'skii Filial Acad. Sci. USSR (V.P.D.) and Bot. Inst., Acad. Sci. Kazak SSR (V.P.B.)]

Barley was among the plants used in the experiments reported. The ability of the leaf tissue to reflect, transmit or absorb the sun's rays varies under the influence of temperature, nutrition and soil moisture content.—M.H.

1923† MATHON, C.-C. **Effet de lumières de courte longueur d'onde sur quelques plantes annuelles durant la photophase de faible intensité.**

[Effect of short-wave light on some annual plants during a photophase of low intensity.] *C.R. Soc. Biol., Paris* 1960, **154**, No. 12, 2367-9, bibl. 6. [Fac. Sci., Univ. Poitiers, France]

With a relatively weak light (about 1000 ergs/cm²), the effect on plants of blue-band radiations is similar to that of either darkness or white light. The species tested included *Hordeum* sp., *Triticum* spp., *Digitalis sanguinalis* and *Setaria verticillata*.—E.B.O.

1924† KARVÉ, A. Die Wirkung verschiedener Lichtqualitäten auf die Öffnungsbewegung der Stomata. [The effect of different qualities of light on the opening movement of stomata.] *Z. Bot.* 1961, **49**, No. 1, 47-72, bibl. 15, illus. [Bot. Inst., Univ. Tübingen, W. Germany]

Maize seedlings were the experimental plants.—D.B.

1925† JAMALAINEN, E. A. Taxering av övervintringsskador på åkerväxter. Estimation of winter damage in agricultural plants. *Nord. JordbrForskn.* 1960, **42**, No. 3, 107-10.

RADIOBIOLOGY

1926† PEREDEL'SKIĬ, A. A. and BOGATYREV, I. O. Differences in the character of Ca⁴⁵ and Sr⁹⁰ accumulation in leaves and roots. [Russian] *Ž. Obšč. Biol. (J. Gen. Biol.)* 1961, **22**, No. 1, 74-5, English summary.

WEEDS AND WEED CONTROL

For weeds associated with a crop, see under the crop concerned.

SPECIFIC WEEDS

1931 SELLECK, G. W. Recent advances in the chemical control of wild oats. *Weeds* 1961, **9**, No. 1, 60-71, bibl. 18, illus. [Univ. Saskatchewan, Saskatoon, Canada]

This paper discusses the behaviour of 1, 2, 4, 5-tetrachlorobenzene, CDAA, barban, EPTC, simazin, and 2,3-DCDT [avadox]. The most consistently satisfactory results were obtained with 2,3-DCDT as a pre-emergence spray at 1.5-2 lb/ac in flax, rapeseed, and barley. Barban showed promise as a post-emergence spray in wheat, barley, and rapeseed.—J.D.J.

1932 KLOSE, S. R. Progress results on wild oat control. *Qd agric. J.* 87, No. 4, 227-31.

In a series of trials in the Darling Downs area, avadox at 1-2.5 lb commercial product/ac was used as a pre-emergence herbicide for the control of

The plants used were maize, horse beans and lupins. F. Eng. s.—A.G.G.H.

TECHNIQUES AND APPARATUS

See also Abs. 1663, 1664, 1921.

1927† DE TEMPE, J. Routine methods for determining the health condition of seeds in the seed testing station. (General information.) *Proc. internat. Seed Test. Ass.* 1961, **26**, No. 1, 27-60, bibl. 87.

Methods for the pathological examination of seed are listed under 6 heads and discussed.—G.M.R.

1928† DUBASH, P. J. and KHAN, B. A. A simple apparatus for measurement of seedling growth under controlled temperature. *Bot. Gaz.* 1960, **122**, No. 2, 150-1, bibl. 2, illus.

1929 BENEDICT, H. M. and SWIDLER, R. Non-destructive method for estimating chlorophyll content of [soyabean] leaves. *Science* 1961, **133**, No. 3469, 2015-16, bibl. 3. [Stanford Res. Inst., South Pasadena, California]

A linear relationship is established between the chlorophyll content in soyabean leaves and their degree of reflexion of light of 625 mμ wavelength.—R.H.F.

1930† OLIEN, C. R. A method of studying stresses occurring in plant tissue during freezing. *Crop Sci.* 1961, **1**, No. 1, 26-8, bibl. 7, illus. [Michigan Agric. Exp. Sta.]

wild oats (*Avena fatua* and *A. ludoviciana*). The herbicide was applied in 10 gal of water and worked into the seed-bed, with a combine seed drill, within 24 hr of spraying. At 1-1.5 lb/ac, avadox gave good control of wild oats but with a reduction in stand of Walsh linseed (up to 25%), Festival wheat (up to 33%), and Prior barley (up to 47%).—R.H.F.

1933 EVANS, S. A. Dalapon for the control of "couch" (*Agropyron repens*, *Agrostis gigantea* and *Agrostis stolonifera*). *Proc. 5th Brit. Weed Contr. Conf.* 1960, 287-300, bibl. 1. [Weed Res. Org., Oxford]

Seventeen trials, in which couch or bent (*Agropyron repens*, *Agrostis gigantea* and *A. stolonifera*) was treated with dalapon at rates ranging between 4 and 20 lb/ac, were carried out on farms by NAAS during 1957-9. Results showed dalapon

to be unreliable in its effects under the farm conditions obtaining. Split applications of dalapon, pre-spraying top-dressing with nitrogen, and rolling before or after spraying had little effect on the control of these weeds. F. s.—R.B.

1934 HOLLY, K. and CHANCELLOR, R. J. The response of *Agropyron repens* to amino triazole. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 301–9, bibl. 3. [A.R.C. Unit Exp. Agron., Oxford]

1935 PROCTOR, J. M. Rotary cultivation for the control of rhizomatous grass weeds. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 265–9, bibl. 1.

Rotary cultivation of a couch-infested light silt soil in 1959 gave reasonable control of *Agrostis gigantea* and *Agropyron repens*, but the rotary cultivator could not give effective control where tractor power was inadequate. When a chemical (amitrol, dalapon or TCA) was combined with rotary cultivation, rather better control was obtained than from either alone, but this was not sufficient to make the combined treatment worthwhile. Rotary cultivation alone appeared more effective than herbicides alone. Of the chemicals used, activated amitrol was the most effective. F. s.—R.B.

1936 PROCTOR, J. M. Control of reeds (*Phragmites communis*) in arable land with dalapon. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 331–3.

From the results of limited trials, it was concluded that dalapon at 15 lb a.e./ac could be expected to give good control of *P. communis* in arable fields on fen peat soils when applied to a good growth of foliage. Applying dalapon to cereal stubbles appeared the most suitable procedure. From *Weed Abstr.* 1961, 10, No. 1, Abs. 135.—R.B.

1937† DERSCHIED, L. A. and others. Thistle control with cultivation, cropping and chemicals. *Weeds* 1961, 9, No. 1, 90–102, bibl. 14. [South Dakota Agric. Exp. Sta., Brookings]

From 1955 to 1958 experiments on the control of Canada thistle (*Cirsium arvense*) and sow-thistle (*Sonchus arvensis* and *S. uliginosus*) were conducted in 5 categories, to study implements for fallowing, annual cropping plus herbicides, perennial cropping plus herbicides, soil sterilants, and the screening of new chemicals. The ester and amine forms of 2,4-D were effective against both types of thistles, and MCPA was effective against Canada thistle. With annual cropping the advantage so gained was consolidated by a second spraying in late summer, cultivation after harvest, and a competitive crop in the following year. A fallow followed by lucerne and brome-grass was effective without the use of herbicides. For fallow-

ing, a duckfoot cultivator or a one-way disc was used 5 times at 4-week intervals, or a tandem disc harrow twice on each of 8 occasions at fortnightly intervals. Several soil sterilants were used successfully to eliminate small patches of thistles. Amitrol and 4-(2,4-DB) also controlled Canada thistle.—J.D.J.

1938 VERHOEVEN, G. and COWDRY, W. A. R. New attack on nut grass in the Burdekin. *Qd agric. J.* 87, No. 4, 239–42, illus. [Ayr Regional Exp. Sta.]

An experiment carried out in 1959 showed that a heavy infestation of nut grass (*Cyperus rotundus*) could be virtually eliminated by a sequence of 6 ploughings and 6 cultivations during the dry season, when the soil temperature reached 118°F at 1 in. below the surface, together with 6 sprayings of 2,4-D amine at 3 lb a.e./ac during the ensuing wet season.—R.H.F.

1939 MAURITIUS SUGAR INDUSTRY RESEARCH INSTITUTE. Further studies on *Cynodon dactylon* biotypes. *Rep. Sug. Industr. Res. Inst., Mauritius* 1960 1961, 77, illus.

1940† DOYON, D. Les aires géographiques actuelle et primitive d'*Asclepias syriaca* L. en Amérique. [Present and former distribution of *A. syriaca* in America.] *Rep. Que. Soc. Protect. Pl.* 1959 1960, 41, 43–68, bibl. 234, maps 2. [Div. Mauvaises Herbes, Min. Agric., Quebec, Canada]

The present-day distribution of *A. syriaca* in N. America is compared with its distribution at the time of the Quaternary glaciation. It now occurs in 6 Canadian provinces (from Manitoba to Nova Scotia) and 36 states in the USA. [See *Herb. Abstr.* 30 : 225.] F. s.—R.B.

1941† RIVALS, P. Sur la vie et les problèmes de la destruction d'*Oxalis latifolia* Kunth. [Biology of *O. latifolia* and problems of its control.] *J. Agric. trop. et Bot. appl.* 1960, 7, No. 9–10, 397–405, bibl. 9, illus. [Éc. Nat. Sup. Agron. Toulouse, France]

A botanical description and notes on distribution and propagation are given on the weed *Oxalis latifolia*, which is spreading in France and other countries. Possible control measures are examined but none gives adequate control.—E.B.O.

1942 VOEVODIN, A. V. [Correlation between root development and efficiency in weed control measures.] [Russian] *Bjull. Moskov. Obščest. Ispyt. Prirody, Otdel Biol.* (Bull. Moscow Soc. Naturalists, Biol. Div.) 1961, 66, No. 1, 69–79, bibl. 22.

The study is concerned with the following weeds: *Convolvulus arvensis*, *Cirsium arvense*, *Acropilton picris*, *Sonchus arvensis* and *Cardaria draba*.—M.H.

1943† JANSSEN, E. J. Ervaringen met de chemische onkruidbestrijding in waterrijke sloten. [Experiences with chemical weed control in ditches containing water.] [Abstract] *Tijdschr. PlZiekt.* 1961, **67**, No. 2, 67.

Spraying ditches in July and Aug. gave the best results; spraying twice per year gave better results than spraying once per year at the same total rate of herbicide. Dalapon at 15 kg/ha mixed with 2 kg a.i. growth substance (preferably 2,4-D) per ha controlled most weeds. Weed control in the wet year 1960 was less effective than in 1958 and '59, and more regrowth occurred. Control was best on fairly acid soils. For heavy infestations of tall weeds [*Glyceria maxima*, *G. fluitans*, *Puccinellia* sp., *Acorus calamus*, *Iris pseudacorus*, *Butomus umbellatus*], spraying at high volume under high pressure gave the best results, while *Stratiotes aloides* and *Sium* sp. were best controlled with low-pressure, low-volume sprays.—R.B.

1944 SIRCAR, S. M. and RAY, A. Growth substances separated from the root of water hyacinth by paper chromatography. *Nature, Lond.* 1961, **190**, No. 4782, 1213–14, bibl. 2. [Dept Bot., Univ. Calcutta]

Some evidence indicating the presence of growth substances in the root extract of the water hyacinth (*Eichhornia speciosa*), presumably related to the rapid multiplication of this weed, was reported in 1959. As a result of more recent work it is concluded that the root extract of this weed contains growth substances in addition to indole compounds or gibberellins.—A.G.G.H.

1945 PLUCKNETT, D. L. and STONE, B. C. The principal weedy Melastomaceae in Hawaii. *Pacif. Sci., Hawaii* 1961, **15**, No. 2, 301–3, bibl. 7.

A key to, and brief description of, *Tibouchina semidecandra*, *Melastoma decemfidum* and *M. malabathricum* are given.—R.H.F.

1946 JEATER, R. S. L. and McILVENNY, H. C. The control of perennial grasses with dipyrldyl herbicides alone and in mixtures. *Proc. 5th Brit. Weed Contr. Conf.* 1960, 311–20, bibl. 2. [Jelott's Hill Res. Sta., Bracknell, Berkshire]

Glasshouse and box tests indicated that mixtures of diquat or PP. 910 (1,1'-dimethyl-4,4'-dipyridylum dimethosulphate) with dalapon or amitrol gave initially quicker top kill of the existing foliage than dalapon alone and better translocation of the chemicals. Subsequent field trials confirmed the quicker initial effects from the mixtures but these mixtures did not appear to have any greater effect on regrowth than did dalapon alone. The addition of wetters improved the action of the dipyrldyl herbicides but did not have any marked effect on the other treatments. F. S.—R.B.

HERBICIDES

1947 VOSSEN, T. Ervaringen met simazin in het Rijkslandbouwconsulentschap Horst. [Experiences with simazin in the Horst National Agricultural Advisory Area (Netherlands).] [Abstract] *Tijdschr. PlZiekt.* 1961, **67**, No. 2, 66.

From weed control experiments using simazin carried out during 1957–60 the following conclusions were drawn: (a) rates of 5 kg simazin/ha did not depress maize yields; (b) good results were obtained in lupins grown for seed at rates of up to 2 kg simazin/ha, but this rate was too high for lupin catch crops; (c) simazin at 1 kg/ha gave moderate to excellent weed control in peas; (d) simazin reduced yields of potatoes, inhibited growth of spring barley, and was not promising for weed control in lupins or for controlling wild oats; (e) on dry soil insufficient weed control was obtained.—R.B.

1948 BURNSIDE, O. C. and BEHRENS, R. Phytotoxicity of simazine. *Weeds* 1961, **9**, No. 1, 145–57, bibl. 12. [Univ. Minnesota, St. Paul]

See Abs. 437.

1949† LEASURE, J. K. and JOSEPHS, M. J. Acetylenic derivatives as herbicides. *Weeds* 1961, **9**, No. 1, 103–5. [Dow Chemical Company, Midland, Michigan]

1950† ELINGS, H. and DAAMS, J. Eigenschappen van het nieuwe herbicide "Casoron 133", 2,6-dichloorbenzonitril. [Properties of the new herbicide 2,6-dichlorobenzonitrile.] [Abstract] *Tijdschr. PlZiekt.* 1961, **67**, No. 2, 68.

The above herbicide kills germinating seeds and possibly also dormant seeds on contact, occasionally damages growing points, and usually completely arrests root growth. Most seeds are equally susceptible, and selective control of unemerged weeds is possible in established crops at rates of 4 kg 2,6-dichlorobenzonitrile/ha. Bracken is well controlled with an initial application of 15 kg/ha; a lower rate may well be sufficient to control the slight regrowth which occurs during the following year. Applying 2,6-dichlorobenzonitrile to potato clamps at 1 g/1000 kg potatoes effectively controls sprouting.—R.B.

1951 JANSSEN, D. Ervaringen met het onkruidbestrijdingsmiddel Ivosit. [Experiences with the herbicide Ivosit.] [Abstract] *Tijdschr. PlZiekt.* 1961, **67**, No. 2, 67–8.

Ivosit (2-sec-butyl-4,6-dinitrophenylacetate) is a less dangerous material than dinoseb or DNOC, is more selective for certain crops and gives better results than other dinitro herbicides should rain fall shortly after application. It is suitable for

selective weed control in grain crops other than spring barley, at the same rates as those recommended for DNOC.—R.B.

1952† TREVETT, M. F. and MURPHY, H. J. A guide for the use of chemical weed killers in 1961. Weed control in vegetables, small fruits, field crops, and turf. *Misc. Publ.* 645 *Maine agric. Exp. Sta.* 1961, pp. 35, illus.

1953† WOOTEN, O. B. and MCWHORTER, C. G. A device for subsurface application of

herbicides. *Weeds* 1961, 9, No. 1, 36–41, bibl. 5, illus. [Mississippi Agric. Exp. Sta. Delta Branch, Stoneville]

1954† LANDWIRTSCHAFTLICHES ZENTRALBLATT. Moderne Unkrautbekämpfung. [Modern weed control.] Berlin: Inst. f. Dokumentation der Deutschen Akademie der Wissenschaften zu Berlin, 1961, pp. 48.

This is a classified collection of abstracts (in German) of papers (published 1956–60) from several countries.—D.B.

SURVEYS AND LAND USE

LAND USE

1955 LUTZ, J. L. Zum Problem der Buckelwiesenkultur bei Mittenwald. [The problem of hummock-grassland cultivation near Mittenwald [Bavaria].] *Mitt. Landk., Moor- u. Torfwirtsch.* 1959, 7, No. 4, 169–203, bibl. 20, illus.

'Buckelwiesen' is the German term used for a type of grassland possessing small hemispherical or ellipsoidal mounds. This land configuration has been observed in several parts of the European alps. The problem in S. Bavaria is one of resolving the demands of agriculture and the Nature Conservancy. This paper discusses the theories of origin which have been put forward, the natural plant associations and soil structure, the agricultural situation, soil cultivation, crops and permanent grassland. A brief account is given of the methods used in cultivating the land for arable cropping, chiefly for subsistence farming. The usual rotation is of rye/potatoes/oats/grass (long term).—D.B.

1956 HARRISON CHURCH, R. J. Problems and development of the dry zone of west Africa. *Geogr. J.* 1961, 127, No. 2, 187–204, bibl. 8, maps.

Among the aspects examined are irrigation and rice cultivation. The countries considered include Mauritania.—E.B.O.

1957† SILAN, C. S. Arid zone problems and research in Turkey. *Arid Zone UNESCO* 1961, No. 11, 9–13.

LAND RECLAMATION

1958 EDMONDSON, P. A. Experiments on restored opencast coal sites. Winter wheat variety trials 1957–59. *Exp. Husb.* 1961, No. 6, 100–4.

Results of trials at different sites each year in the West Riding of Yorkshire indicated that, of 6 wheat varieties tested, Cappelle gave slightly better yield than other varieties, particularly at high N levels, but that Welcome was to be preferred on account of its superior grain quality.—R.H.F.

1959† BLOOD, J. W. and others. Restoration to agriculture of land worked for iron stone and levelled without the addition of topsoil. Studies in the East Midlands region. *Exp. Husb.* 1961, No. 6, 90–9, bibl. 1.

1960† TEJWANI, K. G. and NARAYANA, V. V. D. Reclamation of small [shallow] and medium size gullies in Gujarat ravines. *J. Soil Wat. Conserv. India* 1960, 8, No. 2 and 3, 26–39, bibl. 10, illus. [Soil Conserv. Res. Demonstration and Training Centre, Vasad (W. Rly)]

1961 PEARSON, G. A. and AYERS, A. D. Rice as a crop for salt-affected soil in process of reclamation. *Product. Res. Rep.* 43 1960, pp. 13. [Abstract in *Rice. J.* 1961, 64, No. 3, 37–8.] [U.S. Salinity Lab., Riverside, California]

Rice can often be grown profitably on saline soils subject to leaching by water-ponding, because of its tolerance of submergence and some salinity and its shallow rooting system which requires only moderate downward movement of the salts. It is salt-sensitive at the early seedling and flowering stages. For sowing by drill the soil surface must be salt-free, but when sown broadcast under flooded conditions slight salinity is tolerated. Yield may be reduced to 50% when soil conductivity reaches 8 millimhos, but varieties differ in their tolerance.—R.H.F.

1962† KARMON, Y. The drainage of the

Huleh Swamps [Israel]. *Geogr. Rev.* 1960, **50**, No. 2, 169-93, bibl. 16 (in text), illus., 6 maps. [Hebrew Univ., Jerusalem]

An account is given of the development of the

drainage project, the allocation of land, and the irrigation techniques used. Land use is influenced by the distance of the area from urban markets.—A.M.H.

FARMING SYSTEMS AND PRACTICES

See also Abs. 1699.

1963† BALLATORE, G. P. Aspetti agronomici dell'irrigazione in Sicilia. [Agronomic aspects of irrigation in Sicily.] *Atti Conv. Irrigazione in Sicilia, Palermo, June, 1959* 1961, pp. 14, illus.

1964 HUGHES, W. F. and MAGEE, A. C. Some economic effects of adjusting to a changing water supply, Texas High Plains. *Bull. 966 Texas agric. Exp. Sta.* 1960, pp. 27, bibl. 18, 5 maps.

Ground-water levels dropped by an average of 43 ft during the period 1937-58. A survey in 1958 revealed that the decline in available irrigation water had resulted in the following changes in farming practice: growing crops irrigated in autumn and winter in place of crops irrigated in summer, staggering the sowing of sorghum, concentrating available water on cotton, irrigating in alternate rows and reducing the irrigated acreage.—R.H.F.

1965† BONNEN, C. A. Types of farming in Texas. *Bull. 964 Texas agric. Exp. Sta.* 1960, pp. 50, illus., 38 maps.

1966 THOMPSON, L. G., Jr and ROBERTSON, W. K. Effect of rotations, fertilizers, lime and green manure crops on crop yields and on soil fertility, 1947-1957. *Bull. 614 Fla agric. Exp. Sta.* 1959, 60, bibl. 11, illus.

1967 McILVAINE, T. C. and others. Crop rotation experiments in the Ohio Valley, 1937-1952. *Bull. 453 W. Va agric. Exp. Sta.* 1961, pp. 34.

Ten rotations, using 1-4 main crops in each, were investigated. Maize was a constituent of all rotations and wheat or barley of the multiple-crop-rotations. Potatoes, soyabeans, lucerne and red clover/timothy [*Phleum pratense*] made up the

higher order rotations. Liming and fertilizing treatments were included in the experiments. Apart from yield increases due to these treatments it was concluded that the yield [of maize, wheat and barley] increased (1) with length of rotation and (2) when a legume, either ploughed-in as a green manure or as a crop residue after its removal as hay, was included.—R.H.F.

1968† UNIVERSITY OF SASKATCHEWAN. Guide to farm practice in Saskatchewan 1960. 1960, pp. 193, illus.

1969† ROCHE, P. and VELLY, J. Efficacité des cultures d'engrais verts dans le maintien de la fertilité de quelques types de sols à Madagascar. [Effectiveness of green manures for maintaining the fertility of some soil types in Madagascar.] *Agron. trop., Paris* 1961, **16**, No. 1, 7-51, English and Spanish summaries.

This article examines the effects of green manures (several legumes were used) in controlling erosion, maintaining soil fertility and raising the yields of the subsequent crops on 4 soil types of Madagascar. A green manure ploughed-in with a mineral fertilizer (K, PK or NPK) maintained soil fertility in certain cases.—E.B.O.

1970 BATALIN, M. Działanie nawozów zielonych w poplonach. Działanie nawozowe poplonowych zasiewów wyki ozimej na glebie piaszczystej. [Manuring effects of winter vetch after-crop sown on sandy soil.] *Roczn. Nauk rol.* 1960, **83**, Ser. A, No. 1, 73-111, bibl. 30, English summary.

The manurial effect of a well grown mixture of hairy vetch (*Vicia villosa*) and rye (at a seed rate of 60 kg/ha for both) on a following crop of potatoes was equivalent to 25 metric tons f.y.m./ha ploughed in at the same time. This effect had virtually vanished by the third cropping season.—G.M.R.

SOIL AND WATER CONSERVATION

1971† VIGNAL, M. La conservation des sols à Madagascar. [Soil conservation in Madagascar.] *Bois For. Trop.* 1961, **75**, 17-26. [Seen in *Mon. analyt. Bull. B.I.S.* 1961, No. 3, 58-9.]

A description is given of anti-erosion measures undertaken in a pilot scheme in the Lake Alaotra valley. They include : (1) restoration of degraded land of more than 12% slope by producing a protective (40%) vegetative cover, fire control, diversion of excessive run-off from pastures, and reforestation using *Acacia dealbata* and *Eucalyptus*; and (2) increased production from cultivated land on slopes of less than 10% by means of improved water use in irrigated rice fields, replacement of natural fallow by intensive fodder cropping [no details given], and production of maize and groundnuts without irrigation. From 1954-7 the income of 46 families adopting these measures increased 4-fold.—R.H.F.

1972† NIXON, P. R. and SCHWAB, G. O. Water yield prediction in southern Iowa based on watershed characteristics. *Iowa State J. Sci.* 1961, **35**, No. 3, 331-42, bibl. 13.

Factors based on the 5 characteristics, climate, soil, land slope, land use, and practices of management and conservation were used to develop an empirical formula to predict the amount of run-off per unit area from watersheds in southern Iowa. When compared with measured run-off from 5 watersheds the estimated figure was correct to within 12%.—R.H.F.

1973† CROW, F. R. Reducing reservoir evaporation. Application of surface films cuts losses. *Agric. Engng, St. Joseph, Mich.* 1961, **42**, No. 5, 240-3, bibl. 6, illus. [Oklahoma Agric. Exp. Sta., Stillwater]

When a film of hexadecanol was maintained, by continuous (24 hr/day) application of the powder in slurry form for 66 days, evaporation was reduced by 25%. The water temperature was increased by 5.4°F at the surface and by 3°F at a depth of 5 ft when compared with a non-treated reservoir. Evaporation was reduced by only 6% when the film was applied for 12 hr/day. In an 11-day test period during typical weather in Aug. the cost of saving water by this method amounted to 89ct (US)/1000 gal. F.S.—R.H.F.

AGRO-METEOROLOGY AND CLIMATOLOGY

1974 GERBER, J. F. A comparison of evapotranspiration as estimated by the heat budget and measured by the water balance from a corn field. *Diss. Abstr.* 1960, **21**, No. 6, 1318. [Univ. Missouri, Columbia]

1975† McMILLAN, W. D. and BURGY, R. H. Interception loss from grass. *J. Geophys. Res.* 1960, **65**, No. 8, 2389-94. [Univ. California, Davis]

Field studies were conducted to measure interception loss from an actively transpiring grass cover. Continuous records of evapotranspiration were obtained from a pair of floating lysimeters in a grass field. The grass cover on and around each lysimeter was sprinkled alternately. No appreciable differences were observed between evapotranspiration from wetted and from unwetted vigorous grass covers. Differences were significant when dead grass stubble was placed on and around the lysimeters. The data indicate that evaporation from wetted leaf surfaces may replace all or part of normal transpiration and that the entire plant/soil system should be considered in

evaluating interception loss. From *Biol. Abstr. (D)* 1961, **36**, No. 10, Abs. 32009.—R.H.F.

1976† VAN BAVEL, C. H. M. Lysimetric measurements of evapotranspiration rates in the Eastern United States. *Proc. Soil Sci. Soc. Amer.* 1961, **25**, No. 2, 138-41, bibl. 11.

Methods for determining evapotranspiration in the field are reviewed and it is concluded that lysimetric methods, and in particular those involving weighing, are the most reliable and practical. Data from 4 localities in eastern USA are used to confirm the theory that, when soil moisture is not limiting, evapotranspiration is determined by meteorological factors rather than crop morphology.—R.H.F.

1977 ROBINS, J. S. and HAISE, H. R. Determination of consumptive use of water by irrigated crops in the Western United States. *Proc. Soil Sci. Soc. Amer.* 1961, **25**, No. 2, 150-4, bibl. 16.

Some of the procedures for the estimation of consumptive use (= evapotranspiration) are dis-

cussed, including the Blaney-Criddle, Thornthwaite and Penman methods and the use of atmometers and evaporation pans. Their applicability and limitations are discussed. It is concluded that any method for indirect assessment of evapotranspiration, other than by measurements of multiple turbulent transfer or energy balance is strictly empirical but that the empirical relationships available are adequate for the design of irrigation projects at present.—R.H.F.

1978† DAILEY, R. T. and others. **Estimates of supplemental water needed by forage crops in Pennsylvania.** *Bull. 699 Penn. agric. Exp. Sta.* 1960, pp. 36, bibl. 10, map.

The estimates given are based on rainfall data from 36 stations in Pennsylvania over the past 31 yr, together with estimates by the Blaney-Criddle method (described) of consumptive water use by various crops. Assumptions made in the process include: (1) over the range of soils concerned, field capacity is equivalent to 3–4.5 in. of available moisture in the root zone; (2) no irrigation is required when daily rainfall exceeds 0.2 in.; (3) soils are at field capacity on 1 May each year. The estimates provide information for 36 localities on the seasonal frequency of need for an irrigation system, the time of need during a season based on a soil-moisture "bank account" method, and the quantities of water required by each crop in 3, 5 and 7 yr out of 10.—R.H.F.

1979† DAKSHINAMURTI, C. and others. **Evaluation of effective rainfall and irrigation from ground-water measurements.** *Nature, Lond.* 1961, **190**, No. 4781, 1100–1, bibl. 10. [Indian Agric. Res. Inst., New Delhi—12]

1980† MONTEITH, J. L. and SZEICZ, G. **The radiation balance of bare soil and vegetation.** *Quart. J. R. met. Soc.* 1961, **87**, No. 372, 159–70, bibl. 16. [Rothamsted Exp. Sta., Harpenden, Herts]

1981 PRINE, G. M. and others. **Measurement of meteorological elements of the microclimate.** *Rep. Fla agric. Exp. Stas 1959* [n.d.], 56–8. [Gainesville, Florida]

Measurements of light intensity within 4 populations of Dixie 18 maize grown in 38-in. rows were made, beginning just before tasseling and ending at the early dent stage. The amount of unintercepted light reaching the bottom leaves and the soil in stands 9–11 ft tall decreased as stand density increased from 5000 to 17,000 plants/ac. At the highest stand density, only a few scattered spots of unintercepted light reached the soil surface. Number of ears per plant decreased

as stand density increased. In maize stands at the early silking stage and at the highest stand density, less than 800 f.c. reached the lower half of the stem and leaves at mid-day during fair days in June, and less than 400 f.c. on heavily overcast days. It was considered that the lower leaves of maize in dense stands do not receive sufficient light to synthesize enough food for respiration and that translocation of photosynthates into these leaves occurs. Lower leaves of such plants deteriorated rapidly just prior to and during silking. The carbon dioxide content of the air 6 ft above ground level in a stand of maize 8 ft high at a density of 18,000 plants/ac showed a maximum decrease of 6%. Slight wind movement and normal diffusion tended to restore the carbon dioxide concentration to the normal level. The minimum measured rate of carbon dioxide evolution from the soil was over 90 lb/ac/day.—R.B.

1982† SCHLEUSENER, R. A. **Hailstorm damage to crops in northeastern Colorado and an analysis of precipitation anomalies associated with a cloud-seeding program in 1959.** *J. Amer. Soc. Sug. Beet Technol.* 1961, **11**, No. 5, 413–28, bibl. 9, illus., 6 maps.

Methods for evaluating changes in hail damage, 1929–59, are discussed. As a result of the cloud-seeding programme covering an area of 3400 sq. miles, 8 out of 10 storms showed positive precipitation anomalies. The probability of such a result occurring from an unbiased population is 0.0547.—R.H.F.

1983† PROHASKA, F. J. **El problema de las sequías en la región semiárida pampeana y la sequía actual. [The drought problem in the semi-arid region of La Pampa (Argentina) and the present drought.]** *Idia* 1960, No. 155, 53–67, bibl. 7.

1984† GREEN, R. **Technical reports on the meteorology and climatology of arid regions. No. 8. Probabilities of drought and rainy periods for selected points in the southwestern United States.** *Rep. 8 Univ. Ariz. Inst. Atmosph. Phys.* 1960, pp. 28.

Daily weather records for 10 weather stations were used to compute the empirical probabilities that droughts of 5, 10, 15, 20 or 25 days or rainy periods of 3, 5, 10 or 15 days would start on any day between 15 April and 15 Sept. The results are presented graphically. F. s.—R.H.F.

1985† HALLAIRE, M. **Les conditions d'alimentation en eau des végétaux en 1959. [The conditions of water supply to plants in 1959 (in France).]** *Fourrages* 1960, No. 2, 79–86. [Sta. Centr. Bioclimatol. INRA, France]

Maps show the deficit of water in the soil in N. France in July–Oct. 1959 and the dates when the water supply to plants became deficient.—E.B.O.

1986† COLLINS, B. G. A standing dew meter.

Met. Mag. 1961, **90**, No. 1065, 114–20, bibl. 4, illus.

A portable, battery-operated dew meter is described which gives a direct reading of the total water deposit on a uniform short-grass surface, such as a well cut lawn. F. s.—C.L.S.

MISCELLANEOUS

1987† UNITED NATIONS. Review of the agricultural situation in Europe at the end of 1960. Prepared by the ECE/FAO Agriculture Division of the Secretariat of the Economic Commission for Europe, Geneva, 1961. pp. 138.

1988 MURRAY, K. L. The agricultural situation in Rumania. *Publ. ERS Foreign-4 U.S. Dep. Agric.* 1961, pp. 30, bibl. 13 (general), map.

1989† PEPELASIS, A. A. and THOMPSON, K. Agriculture in a restrictive environment: the case of Greece. *Econ. Geogr.* 1960, **36**, No. 2, 145–57, bibl. 33 in text.

Reasons for the agricultural backwardness of Greece are discussed.—A.M.H.

1990† PARKS, J. R. and GAZAWAY, H. P. Alaska farm facts: a compilation of agricultural statistics for the years 1953 through 1957. *Bull. 27 Alaska agric. Exp. Sta.* 1961, pp. 34, bibl. 10, 1 map.

1991† LYNCH, J. V. and FERREE, P. J. The agricultural economy of Bolivia. *Publ. ERS Foreign-1 U.S. Dep. Agric.* 1961, pp. 19, illus.

1992 ROSS, J. E. and KIRBY, R. H. South Korea's agricultural economy. *Publ. ERS Foreign-2 U.S. Dep. Agric.* 1961, pp. 26, map.

1993 CENTRAL OFFICE OF INFORMATION. Economic development in the Commonwealth. Revised 1960, pp. 134, 23.5 × 15 cm, London: HMSO.

In this survey, the material resources of each country and the uses to which they are put are described. The role of agriculture in the economy is depicted and the more important agricultural developments are noted.—C.L.S.

1994† SPENCER, D. M. Fungicides in agri-

culture and horticulture. *Nature, Lond.* 1961, **190**, No. 4776, 593–4.

This is a review of papers delivered during a symposium entitled 'Fungicides in agriculture and horticulture' organized by the Pesticides Group of the Society of Chemical Industry and held in London on 20 and 21 March 1961.—A.G.G.H.

1995† BAKER, B. G. and SHAFER, J. G. Morven —new Dow liquid seed protectant and disinfectant containing sodium 2,4,5-trichlorophenolate. *Down to Earth* 1961, **16**, No. 4, 10–12.

Toxicity levels for seeds and recommended dosage rates for seed of a range of field and forage crops are given, e.g. cereals, cotton, groundnuts, sugar-beet, flax and soyabeans.—R.H.F.

1996† DE TEMPE, J. and CROSIER, W. F. Pesticide treatment. *Proc. internat. Seed Test. Ass.* 1961, **26**, No. 1, 12–26, bibl. 90.

The literature on seed treatment, physical and chemical, against disease is reviewed with particular reference to the behaviour and mode of action of the chemical and its detection on treated seed.—G.M.R.

1997† HOFFMANN, E. and FRITZSCH, K. Zur Frage der Standraumversuche. [The problem of spacing trials.] *Z. landw. Vers.- u. UntersuchWes.* 1960, **6**, No. 5, 437–45, bibl. 8, English and Russian summaries.

This is a statistical study and distinguishes between trials involving the design of spacing and those concerned with distance between plants. F. Ger. s.—D.B.

1998† AMERICAN SOCIETY OF AGRONOMY. 1960 agronomy abstracts. 1960, pp. 79, Chicago: American Society of Agronomy.

This publication contains abstracts of papers presented at the 52nd Annual Meeting of the above Society. 628 authors are noted.—R.H.F.

REPORTS

- 1999† **Great Britain.** Commonwealth Agricultural Bureaux. Report of Review Conference 1960. London : HMSO, 1961, pp. 123, 6s.
- 2000† **Great Britain.** Report of the Rothamsted Experimental Station for 1960. Harpenden, 1961, pp. 329, 1 map.
See Abstracts 1568, 1586, 1634, 1636, 1761, 1762, 1786, 1808, 1813, 1824, 1921, 2028.
- 2001 **Great Britain.** Nickersons, Plant Breeders and Seed Specialists. Annual report of the Rothwell Research and Plant Breeding Station, Grimsby, [n.d.], pp. 25.
At Rothwell, Lincs, a wide range of crop varieties and hybrids produced by the Nickerson Organization and over 30 plant-breeding stations in Europe, are tested. The 4 stages of the testing procedure are outlined. Outstanding varieties, which are described, include Viking winter wheat, Vada spring barley, Limbra swedes, C.B. 7 (Centraal Bureau, Holland) and Foliant maize.—R.H.F.
- 2002 **France.** Institut de Recherches du Coton et des Textiles Exotiques. Activité de l'IRCT 1958. [The work of IRCT during 1958.] *Cot. et Fibr. trop.* 1960, **15**, No. 2, 151-365, illus.
See Abstracts 1876, 1884.
- 2003 **France.** Institut de Recherches du Coton et des Textiles Exotiques. Activité de l'IRCT en République Malgache 1959. [The work of IRCT in the Republic of Madagascar during 1959.] *Cot. et Fibr. trop.* 1960, **15**, No. 3, 419-67, illus.
See Abstract 1852.
- 2004 **Northern Nigeria.** Empire Cotton Growing Corporation. Progress Reports from Experiment Stations. Season 1959-60. London, 1961, pp. 22. [Received July 1961]
See Abstracts 1843, 1864.
- 2005 **Aden Protectorate.** Progress Reports from Experiment Stations. Season 1959-60. Empire Cotton Growing Corporation. London, 1961, pp. 28. [Received March, 1961]
See Abstracts 1857, 1863.
- 2006 **Kenya.** Empire Cotton Growing Corporation. Progress Reports from Experiment Stations. Season 1959-60. London, 1961, pp. 14. [Received March 1961]
See Abstract 1845.
- 2007 **Nyasaland.** Empire Cotton Growing Corporation. Progress Reports from Experiment Stations. Season 1959-60. London, 1961, pp. 10. [Received July, 1961]
See Abstract 1640.
- 2008 **Zanzibar.** Supplement to the Annual Report of the Department of Agriculture, 1959. Results of field experiments, crop and stock record, and other statistics. Zanzibar, 1960, pp. 24.
See Abstracts 1699, 1834.
- 2009† **Mauritius.** Sugar Industry Research Institute. Annual report 1960. 1961, pp. 143.
See Abstract 1939.
- 2010† **Mauritius.** Annual Report of the Department of Agriculture for the year 1959. Port Louis, 1961, pp. 79.
See Abstract 2034.
- 2011 **Malaya, Federation of.** Department of Agriculture. Annual Report for the year 1959. Kuala Lumpur, 1961, pp. 101, illus.
See Abstracts 1703, 2036.
- 2012† **Hong Kong.** Annual Departmental Report by the Director of Agriculture, Fisheries and Forestry for the financial year 1959-60. Hong Kong, [n.d.], pp. 95, illus.
See Abstract 2037.
- 2013† **Canada.** Forty-first Report of the Quebec Society for the Protection of Plants, 1959. 1960, pp. 131, illus.
See Abstract 1940.
- 2014† **USA.** Florida Agricultural Experiment Stations. Annual Report for the fiscal year ending June 30, 1960. Gainesville, [n.d.], pp. 364, illus.
See Abstracts 1746, 1751.
- 2015† **USA.** University of Florida Agricultural Experiment Stations. Annual Report for the fiscal year ending June 30, 1959. Gainesville, [n.d.], pp. 415, illus.
See Abstracts 1644, 1688, 1748, 1749, 1750, 1981.
- 2016† **USA.** Mississippi Agricultural Experiment Station. 72nd Annual Report. Year ending June 30, 1959. State College, [n.d.], pp. 101, illus. [Received April, 1960]
See Abstracts 1619, 1639, 1689, 1691, 1877.

2017† **FAO.** Report of the fifth FAO Regional Conference for Asia and the Far East. Saigon, Viet-Nam, 21–30 November 1960. [n.d.], pp. 126.

Among the items reviewed and discussed

were the food and agricultural situation in the region, the agricultural development and crop diversification in irrigated agriculture. A summary of resolutions adopted and a list of documents presented are given.—E.B.O.

BOOKS

2018 **SETHI, B. L.** and others. **Cotton in India: a monograph.** Vol. 4. 1961, pp. 388, bibls at end of chaps., illus., Bombay : Indian Central Committee, Rs 30 or 45s.

The fourth and final volume of this monograph contains 6 chapters giving details of cotton cultivation in the 6 ecological regions of India proposed by Sethi and Dharmarajulu. Of the Old World species, *Gossypium arboreum* is grown in 5 of these regions and *G. herbaceum* in 2. The New World species *G. hirsutum* has been established in 3 regions. The northern *hirsutum-arboreum* region receives the most detailed attention, although it is only the rump of a much larger area five-sixths of which accrued to Pakistan at the partition. The Indian portion lies mainly in the Punjab basin, and 90% of the crop is irrigated, so that it yields 180 lb of lint per acre as against an average for all India of 77 lb. Some 20 years ago, *G. arboreum* was grown exclusively but to-day 60% of the cotton average consists of *G. hirsutum*. Aspects of the crop considered are area and production, climate and soil by zones, physiology of growth and fruiting, cultivation including manuring and irrigation, diseases and pests, harvesting, marketing and ginning, improved varieties, seed multiplication, legislation, economics, and cotton-seed products. There is also a discussion of problems and prospects. This first chapter is a complete and satisfying compilation. The other 5 regions are treated on the same lines, but the treatment is much briefer. This seems illogical because Bombay province, comprising most of the central *arboreum* and western *herbaceum* regions, accounts for half the cotton production of India. Furthermore, the omission of data on flowering and fruiting behaviour, for example, from these other regions robs the book of some of its value as a comparative study. The book contains a great quantity of facts and figures and should be indispensable to anyone whose work is connected with the cotton crop in India. It should also be useful to anyone engaged in comparative studies of cotton in different parts of the world, though perhaps not quite so useful as it might have been. To the general reader with no special interest in India the value of this volume will be limited. He may also be embarrassed by the lack of a glossary to the many

local expressions used in the text. Other aspects of the book's production are weak. Three only of the 6 chapters conclude with bibliographies and the classified index under 28 heads does little more than amplify the table of contents. There is a coloured frontispiece of doubtful relevance and the 20 black-and-white plates in the text are poor in quality. The binding is better than in the earlier volumes.—J.D.J.

2019† **VIRGINIA POLYTECHNIC INSTITUTE.** **A handbook of agronomy [in Virginia].** Bull. 97 Va Polytech. Inst. 1959, pp. 167, bibl. in text, illus., 14 maps.

2020† **RUSSELL, E. W.** **Soil conditions and plant growth.** 9th edn, 1961, pp. 704, bibl., illus., London : Longmans, Green and Co. Ltd., 63s.

To those who farm the land, to those who experiment in agriculture and particularly to those who, in ever increasing numbers, have the temerity and foresight to do both, I would recommend the companionship of this book. Farming is fast becoming a specialized section of a closely knit agricultural industry. It is that section which primarily uses land as an agent of production. The efficient use of land requires an understanding of the soil, both in general and particular. Moreover, the effective incorporation into an evolving system of farming of the new techniques, the new machinery and fertilizers and chemical agents made available by other sections of this industry demands some conception of processes and mechanisms—in particular those processes and mechanisms which operate between crops and the soils on which they grow and find expression in yield. Reference to a relevant part of this comprehensive work will invariably provide information on what is involved in a particular relationship between plant and soil. And, as with all good works of reference, the reader will be tempted to read beyond the limits of the original question. The first edition of "Soil Conditions and Plant Growth" by Sir E. John Russell, published in 1912, set a course which has been followed closely by this, the ninth, edition : to eschew opinion and to present a summary of knowledge that the reader's

own judgement be improved. The factual nature of this book is expressed both in the text and in 194 tables and figures. Copious references to literature, given as footnotes to each page, are supplemented by an author index. That the contents deal far more with details of the soil than with growth of plants is a fault not so much of the author, but of the way in which research into soil problems has been conducted, with scant reference to the physiology of crops. It is a pity that the study of plants and soil is so often divorced when the union could be so fruitful. A more serious criticism is that some of the information is not up to date. Only a little arithmetic is probably required to bring the quantities of nutrients removed from an area of soil by different crops, given in table 122, into line with present-day yields. Why present values relevant to yields common in 1886? —C. R. Clement.

2021† STILES, W. **Trace elements in plants.** 1961, pp. 264, bibl. 610, illus., 22 × 14 cm, London: Cambridge Univ. Press, 40s.

As the shorter title suggests, this new edition of what was previously "Trace elements in plant and animals" (see *Herb. Abstr.* 16: 1374) lays the primary emphasis on plants; there is nevertheless a concise and adequately documented chapter on those diseases of grazing animals which can be attributed to excess or inadequate supplies of various trace elements in their food plants.

The book has been enlarged by nearly a third, partly by the bringing up to date of the chapters on deficiency diseases and on the functions of trace elements and partly by the addition of a short chapter on trace-element excess and a longer, and very useful one, on factors influencing the absorption of trace elements and their effects on plants, which deals particularly with soil factors. The bibliography has increased from 432 entries to 610, and the number of illustrations from 12 (13 in the second edition) to 22, so that plants exhibiting symptoms of deficiencies of all the trace elements (except chlorine) are illustrated.

One criticism arises in connexion with chlorine. No mention is made of Ozanne's report of the occurrence of chlorine-deficient soils in California and Australia (see *Soils and Ferts* 22: 363); the impression might be gained that chlorine deficiency had been induced only by careful removal and exclusion of it from the environment, which in fact is not so. Brownell and Wood's report of the essentiality of sodium for *Atriplex vesicaria* (see *Herb. Abstr.* 27: 1107) is also worthy of mention, but gets none. The index is comprehensive and complete.

The book can be recommended, not only to students and practitioners of agriculture and horticulture, but also to research workers including those in plant physiology, plant pathology and bio-

chemistry, for whom it provides a useful and convenient source of information and references gathered together from an extremely wide range of sources.—R. Dorrington Williams.

2022† BUTCHER, R. W. **A new illustrated British Flora. Vol. I. Lycopodiaceae to Salicaceae.** 1961, pp. 1022, bibl. 22, illus., 22 × 15 cm, London: Leonard Hill [Books] Limited, £4.4.0.

This book comes very close to being the ideal Flora. It contains a key to all the species of vascular plants which grow wild in the British Isles, with the exception of obvious garden escapes. The description of each species is adequate to distinguish it from other allied species: there is an indication as to where each is likely to occur and an illustration of each species on the same page as the description. Unfortunately, the work will consist of two large volumes. The first volume, illustrating 885 species, is 6.5 cm thick, so that even half of this work is much too large for convenient perusal in the field. As a laboratory manual, however, it is excellent. The illustrations, usually one species to a page, are accurately drawn from living specimens so that it is not difficult to identify plants accurately using these alone.

The key for identifying plants has of necessity been divided into two parts, one for each volume, but this is not a great drawback. A section entitled "Introduction to Descriptive Botany" explains all the technical terms used in the book; it is fully indexed, thus avoiding the need for an alphabetical glossary. All the plants described in Vol. I have been given both scientific names and English names, some of the latter having been supplied by the author. A few of the scientific names quoted diverge from those given in some recent floras and check-lists, presumably on the grounds that they are more familiar to many botanists, and some well known synonyms are omitted from the text and appear solely in the index. We now have yet another "standard" series of scientific names to add to the confusion over nomenclature. "A new illustrated British Flora" will undoubtedly serve as a standard book of reference, albeit an expensive one, for many years to come.—R. Boyce.

2023† MACHLIS, L. and others [Eds]. **Annual review of plant physiology.** Vol. 12. 1961, pp. 502, 23 × 16 cm, Palo Alto, California: Annual Reviews Inc., \$7.50.

The following papers are noted. (1) Photosynthesis under natural conditions. By J. F. Talling, pp. 133–54. (2) Photosynthesis. By G. Hock and B. Kok, pp. 155–94. (3) Phosphorylation in higher plants. By E. Marré, pp. 195–218. (4) Biochemistry of senescence. By J. E. Varner, pp. 245–64. (5) Plant water deficits and physiological processes. By Y. Vaadia and others,

pp. 265-92. (6) Photoperiodism and the flowering process. By F. B. Salisbury, pp. 293-326. (7) Indole auxins. By C. H. Fawcett, pp. 345-68. (8) Applied aspects of the gibberellins. By N. W. Stuart and H. M. Cathey, pp. 369-94. (9) Kinetin and related compounds in plant growth. By C. O. Miller, pp. 395-408. (10) Geotropism in roots and shoots. By H. Rufelt, pp. 409-30. (11) Photochemical air pollution damage to plants. By J. T. Middleton, pp. 431-48.—R.H.F.

2024† PAPADAKIS, J. [Ed.] **Climatic tables for the world.** 1961, pp. 183, Buenos Aires: Papadakis.

The sub-title of this publication is : 'Evapo-transpiration month by month and annual; humidity index; leaching rainfall, normal and maximum; humid, dry and intermediate seasons, beginning and end of each one; winter severity; summer heat; temperature regime; humidity regime; climatic classification; and corresponding vegetation, soils, land use; for 2400 stations; with a brief discussion of these questions and 7 maps.'—A.G.G.H.

2025 WHITROW, M. [Ed.] **Index to theses accepted for higher degrees in the Universities of Great Britain and Ireland, Vol. 9, 1958-9.** 1961, pp. 184, 24.5 × 15 cm, London: Aslib, 25s.

The following titles are noted: Aerial photographic studies in relation to ecological and land-use surveys (Loxton, R. F.); A study of the nutrient uptake of certain arable crops, grown

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2026† UNESCO. **Bibliography of interlingual scientific and technical dictionaries.** 4th edn, 1961, pp. 272, Paris: UNESCO, 17s. 6d. \$3.50, 12.50 NF(fr).

2027 FREAR, D. E. H. [Ed.] **Pesticide handbook 1961.** 13th edn, 1961, pp. 286, 23 × 15 cm, State Coll., Pennsylvania: College Science Publishers, \$2.00 (paper).

The trade names, active ingredients, uses and manufacturers of 9072 products are given.—R.H.F.

NEWS AND NOTES

Great Britain

2028† WILD OATS. Over 2 million seeds of wild oat (*Avena fatua* and *A. ludoviciana*) ac, at least 50% of which were viable, were present in a field after 6.5 yr under ley. *Rep. Rothamsted exp. Sta.* 1960.—R.H.F.

Italy

2029† A MAP OF LAND UTILIZATION in Italy is being prepared by the Consiglio Nazionale delle Ricerche. It will eventually consist of 26 sheets in colour, on a scale of 1/200,000, showing the distribution of crops, grasslands and forests, with explanatory notes. Publication started in 1956 (to date 11 sheets have appeared) and should be completed by 1965. *Ital. agric.* May, 1961.—E.B.O.

Spain

2030 WHEAT VARIETIES. Sixteen new wheat varieties have now been included in the Register of Varieties of the Instituto Nacional de Investigaciones Agronómicas. The

botanical and agronomical characteristics of these varieties are given in *Bol. agro-pec.* April-June, 1960.—E.B.O.

United Arab Republic

2031 THE DESERT INSTITUTE of the United Arab Republic, established in Cairo in 1950, has worked with the collaboration and assistance of UNESCO since 1953. The Institute has undertaken a programme of integrated surveys, dealing essentially with geology, hydrology, soils and plants, over some selected areas in the deserts of Egypt where immediate agricultural expansion is wanted. These areas are included in: (a) the Mediterranean littoral, west of Alexandria, (b) the N. Sinai foreshore plain and its extension into Gaza in Palestine, (c) the Kharga and Dakhla oases, and (d) the Delta marginal area. *Arid Zone UNESCO March*, 1961.—E.B.O.

Federation of Rhodesia and Nyasaland

2032† *Kirkia*. The first volume of this new journal,

named after Sir John Kirk (1832–1922), the botanist who accompanied Livingstone to the Zambesi, Victoria Falls, Lake Nyasa and elsewhere, was published earlier this year by the Government Printer, Salisbury, Rhodesia. The primary object is to publish information on African botany with special reference to taxonomy, floristic studies, phyto-geography, the history of botany and botanical exploration having a bearing on the flora of the Federation. The cost is £1. 10. 0. per year. *Science-Afrique* Feb., 1961.—R.H.F.

Republic of South Africa

2033 A consignment of 3000 beetles [species not stated] has been imported from Australia for the purpose of attempting the biological control of the toxic weed *Hypericum perforatum*, which is particularly damaging in the Paarl Mountains, and at Stellenbosch, Faure and Helshoogte. *Science-Afrique* Feb., 1961.—R.H.F.

Mauritius

2034 PESTS OF PIGEON PEA (*Cajanus cajan*) were greatly reduced, and a record crop obtained in 1959, following the successful introduction of the parasites *Bracon cajani* and *Eiphosoma annulatum*. *Rep. Dep. Agric. Mauritius* 1959.—R.H.F.

Pakistan

2035† ARID ZONE RESEARCH. In Pakistan, an overpopulated and predominantly agricultural country, the area available for food crops is dwindling. The northern area of W. Pakistan is threatened by soil erosion as a result of deforestation in the catchment areas and overgrazing, while the irrigated arable land of the Punjab plain is likely to be rendered useless for agriculture because of the increasing salinity of the soil. The only reserves of land are in the arid areas of W. Pakistan, half of which, however, has already been damaged by biotic interference and wind erosion. With a view to the development of these arid areas, studies have been carried out, particularly on hydrology and micro-climatology, at the Geophysical Institute in Quetta, with the assistance of UNESCO, since 1951, and on plant ecology during 1956–9 with the assistance of 2 UNESCO experts who were assigned to the Forest Research Institute in Abbottabad. *Arid Zone UNESCO* June, 1961, gives information on a work programme drawn up at the Abbottabad Institute. Priority areas selected for future arid-zone research included areas where improvements are planned for the near future (Thal area), or where there is danger of complete destruction by erosion unless speedy action is taken (Thar-Parkar Desert), or where prospects for improvement are good (Baluchistan highlands).—E.B.O.

Malaya

2036 THE POTATO VARIETY VAN HAERINGEN 52–03 has

proved to be highly resistant to blight (*Phytophthora infestans*). When grown in the Cameron Highlands from imported seed it yielded at the rate of 8.6 tons/ac. *Rep. Dep. Agric. Malaya* 1959.—R.H.F.

Hong Kong

2037 RICE STEM BORER (*Schoenobius incertellus*) was controlled with endrex [rate not stated] in an infested rice area with a resultant net profit of c. £4. 0. 0./ac. *Rep. Dep. Agric. Fish. For. Hong Kong* 1958–9.—R.H.F.

USA

2038 THE NEW OAT VARIETY DODGE is being released to seed growers by the Wisconsin Agricultural Experiment Station where it was developed. Its chief advantages are high resistance to leaf rust and a strong, medium-height straw. *Seed World* 28 April, 1961.—R.H.F.

Argentina

2039 MAIZE. A meeting on maize, organized by the Sociedad Argentina de Agronomía, took place in Rosario, Santa Fe, in Aug. 1958. *Idia* 1960, Suppl. 3 gives the papers presented which were concerned with various aspects of maize in Argentina, including seed treatment, varieties, hybrids, yield, sowing date, seed rate, detasselling and weed control. In years of high rainfall during flowering, detasselling did not affect grain yields, but in years of low rainfall it increased yields.—E.B.O.

2040† AGRICULTURE AND ANIMAL HUSBANDRY in Argentina were reviewed in a lecture by E. Malaccorto, in June 1960, in which data on production, consumption and trade were given and compared, in some cases, with corresponding data from other countries. The text of this lecture, which illustrates the fundamental aspects of the economy of Argentina, together with the graphs shown, are published in *Idia* 1960, Suppl. No. 4.—E.B.O.

International

2041† IRRIGATION AND DRAINAGE. An FAO/UNESCO Working Group has been constituted to study the preparation of an international handbook on irrigation and drainage in relation to salinity and alkalinity of arid lands. The first meeting of the group was held in Rome in Oct. 1960. The handbook is intended (a) to provide a synthesis of modern scientific knowledge on irrigation and drainage, (b) to serve as a guide to the practical experience obtained by leading countries, and (c) to arrive at generalizations useful for solving practical problems in the field. The handbook will be published in English, French, Russian and Spanish and should be ready for publication not later than July 1963. *Arid Zone UNESCO* March, 1961.—E.B.O.

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